



College of Business

**TOTAL QUALITY MANAGEMENT, SERVICE
INNOVATION, AND SUSTAINABILITY
PERFORMANCE IN ABU DHABI'S PUBLIC
SECTOR**

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The Academic Faculty**

By

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TOTAL QUALITY MANAGEMENT, SERVICE INNOVATION, AND SUSTAINABILITY PERFORMANCE IN THE UAE'S PUBLIC SECTOR



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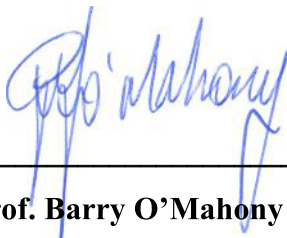


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ABSTRACT

Purpose: This study aims to critically investigate the structural relationships between total quality management (TQM), service innovation, and sustainability performance in the public service sector of the [Emirate of Abu Dhabi in the](#) United Arab Emirates (UAE).

Design/methodology/approach: The study employed an online-survey-based data-collection method, distributing questionnaires to over 400 employees working in eight selected UAE public service sector organizations located in Abu Dhabi. The collected data were analyzed through structural equation modelling (SEM) to empirically examine whether TQM practices improve service innovation and, subsequently, sustainability performance in [Abu Dhabi's](#) public service sector.

Findings: The findings [suggests](#) that TQM has a significant impact on service innovation and sustainability performance in [Abu Dhabi's](#) public service sector. Additionally, it was revealed that service innovation partially mediates the relationship between TQM and sustainability performance. Moreover, the findings of this study confirmed that the social and environmental dimensions are the most significant facets of the public sector's sustainability performance concerning TQM and service innovation, whereas the economic dimension was found to be insignificant. The public sector's prioritization of social and environmental sustainability performance over economic sustainability performance is thus implied.

Practical implications: The public service sector's TQM practices and service innovation in the UAE have a profound impact on social and environmental sustainability as opposed to economic sustainability performance. Adopting five dimensions of TQM [following the Abu Dhabi Award for Excellence in Government Performance (ADAEP) model] across [Abu Dhabi's](#) public organizations will enable government departments to deliver innovative services to its beneficiaries.

Originality: This study provides a substantial contribution by addressing the gaps in the literature. Very few studies have empirically investigated the possible association between TQM, service innovation, and sustainability performance in public sector organizations, particularly in developing countries such as the UAE, where the increasing use of TQM practices is still in its emerging stages, mainly targeting innovative service offerings and sustainable performance.

DECLARATION

I hereby declare that:

The dissertation has been conducted, composed, and produced solely by the candidate. No other persons' works have been used without due acknowledgment and in-text reference in the main text of the dissertation.

The dissertation has not been submitted or utilized in any way for the award of any academic or professional degree or diploma in any other institute or university.

All research procedures reported in the dissertation were approved by ADU Institutional Review Board.

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ABBREVIATIONS

ADAEP – Abu Dhabi Award for Excellence in Government Performance

ADU – Abu Dhabi University

AVE – average variance extracted

CEO – chief executive officer

CFA – confirmatory factor analysis

CFI – comparative fit index

CR – composite reliability

CSP – corporate sustainability performance

CSR – corporate social responsibility

ECN – economic sustainability

EFA – exploratory factor analysis

EFQM – European Foundation for Quality Management

ENV – environmental sustainability

GFI – goodness-of-fit index

IFI – incremental fit index

INN – organizational innovation

KMO – Kaiser–Meyer–Olkin

LED – leadership

MBNQA – Malcolm Baldrige National Quality Award

PDR – partnerships and resources

PPL – people

PPR – product and process innovation

PRS – process

QMS – quality management standard

RBV – resource-based view

RMSEA – root mean square error of approximation

SCL – social sustainability

SDGs – sustainable development goals

SEM – structural equation modeling

SGP – strategy and policy

SI – service innovation

SMC – squared multiple correlation

SP – sustainability performance

STQM – total quality management (TQM) soft dimensions

TBL – triple bottom line

TLI –Tucker–Lewis index

TQM – total quality management

UAE – United Arab Emirates

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CHAPTER 1: INTRODUCTION

1.1 Introduction

This chapter provides an introduction to the study. It presents the context of the study, stressing its motivation, and discusses the theoretical and managerial issues, critically elaborating the research problem and key research gaps with regard to the impact of total quality management (TQM) on sustainability performance in the public sector, as well as the mediating effect of service innovation on the association between TQM and sustainability performance. Furthermore, this chapter presents the research aim, research objectives, and research questions developed in relation to the research problem of the study and the identified theoretical gaps. The significance of the study is also presented in this chapter, and the structure of the dissertation is clearly explained. The chapter concludes with a summary of Chapter 1.

1.2 Context and Research Problem

Over the last few decades, organizations in the public sector have encountered unprecedented challenges (Burke & Martin, 2016). Issues such as budgetary pressures, the rising demand for financial accountability, and the lack of resources, combined with the dynamic and changing public expectations for services provided by the public sector (Mättö, 2019), as well as sustainability issues (Abbas, 2020; Tasleem *et al.*, 2019), require new, high-quality solutions that are different and innovative in nature (Mättö, 2019).

Sustainability encompasses suitable response paradigms regarding economic, social, and environmental responsibilities in relation to products, services, processes, and organizational performance (Abbas, 2020; Adams *et al.*, 2014; Calabrese *et al.*, 2018). Improving sustainability performance has, however, been an area of concern for most organizations,

1 including those in the public service sector, as their long-term sustainability has been
2 threatened by various factors, such as economic, social, and environmental concerns. These
3 include increasing carbon footprints, waste generation, environmental pollution, diminishing
4 water resources, and human rights issues (UAE Government, 2020). Increased stakeholders'
5 awareness of the diminishing natural resources and air, water, and soil pollution, as well as the
6 change in natural climate, are driving organizations to espouse environment-friendly business
7 practices and curtail their dependence on fossil fuel that results in ecological vulnerabilities (Li
8 *et al.*, 2018). Currently, therefore, dynamic organizations prefer to adopt multiple strategies
9 that simultaneously support their overall strategy so that they can attain the goal of sustainable
10 development in a more effective and efficient manner (Abbas, 2020).

11 As stated by United Nations' Brundtland Commission report, organizational development is
12 considered sustainable if it realizes the current generation's needs without compromising the
13 ability of future generation to meet their own needs (cited in Abbas, 2020). According to
14 Adams *et al.* (2014), sustainability is defined as the long- term maintenance of systems in
15 accordance with economic, environmental, and social considerations. These definitions imply
16 the value of stakeholders, as well as that of the environment (for example, future generations'
17 natural resources, such as non-renewable resources), and denote that, to achieve sustainability,
18 organizations must behave ethically by valuing them. Sustainability consists of three
19 dimensions or facets: (1) social sustainability, which concentrates on people and society; (2)
20 environmental sustainability, which relates to the environment and natural resources; and (3)
21 economic sustainability, which focuses on the organizational financial aspects (Shahzad *et al.*,
22 2019; Tasleem *et al.*, 2019). Some studies have also used the term "triple bottom line" (TBL)
23 for these dimensions to reflect sustainability performance (Abbas 2020; Calabrese *et al.*, 2018).
24 The literature suggests that contemporary organizational success encompasses sustainability
25 (Kumar & Prakash, 2019; Laskar & Gopal Maji, 2018; Schaltegger, 2011; Weber, 2017).

1 Sustainability encompasses suitable response paradigms regarding economic, social, and
2 environmental responsibilities in relation to products, services, processes, and organizational
3 performance. Organizations, both in private and public sectors, are thus seeking to espouse new
4 processes, technologies, and techniques to encourage greater accountability, enhance process
5 efficiency, reduce costs, improve quality, and thus also improve their sustainability
6 performance (Tasleem *et al.*, 2019). However, the challenge still remains for organizations
7 since the prevailing dynamic business environment, increased customer concerns regarding the
8 characteristics and quality of the products, and strict global regulations relating to
9 environmental protection are forcing organizations to strictly adhere to strategies such as TQM,
10 the effectiveness and efficiency of which has already been established (Abbas & Sagsan, 2019).

11 TQM is referred to as “the development of an organisational culture, which is defined by, and
12 supports the constant attainment of customer satisfaction through an integrated system of
13 techniques and tools” (Sashkin & Kiser, 1993, p. 39). It is an approach to conducting business
14 operations, attempting to maximize an organization’s competitiveness through continual
15 improvement in relation to the quality of its products, services, processes, people, and
16 environments (Goetsch & Davis, 2010). TQM is usually understood as a mechanism that has
17 the ability to enhance both individual and organizational performance (Mahmood *et al.*, 2014).

18 It not only contributes to increased businesses profitability but also improves the satisfaction
19 of customers and employees (Shafiq *et al.*, 2019). The literature suggests several possible
20 implications of TQM for sustainability performance. For example, owing to TQM’s focus on
21 continuous improvement, it also targets espousing environment-friendly practices by utilizing
22 the minimum level of resources in operations (Qasrawi *et al.*, 2017). Further, the effective
23 application of TQM significantly affects organizations’ green innovation, which is a crucial
24 element of sustainability (Yu & Huo, 2019). Xie *et al.* (2019) stated that by focusing on

operational processes, which is one of TQM's key components, organizations are able to develop environment-friendly products and services.

The degree of TQM's success can vary depending on the type of organization, i.e., private sector or public sector. How performance is achieved and measured in public and the private sectors varies in accordance with their goals, objectives, and core businesses. While the private sector aims to attain profit by satisfying their customers, the intention of the public sector is to achieve customer satisfaction, quality, and good performance. Organizations in the private sector have attained proven success in improving quality and reducing costs by enhancing processing capacity and efficiency by employing best practices in terms of management techniques, such as TQM. Unlike the private sector, however, the main purpose of any public organization is to satisfy its society's needs within the available budget and capabilities (Dewhurst *et al.*, 1999; Kotlar *et al.*, 2018). Governments across the world are today seeking to improve their performance in terms of program outcomes, citizen participation, use of public resources, customer satisfaction, greater integrity, coping with and preventing corruption, and accountability and transparency (Ashour, 2004). Ashour (2004) also stressed that such reforms are critically important to enhancing the performance of public sector organizations, striving for public performance, and fortifying the role of the government in offering basic services and development opportunities. Accordingly, although public sector organizations by their very nature have diverse intangible objectives, policies, and actions compared to private sector organizations (Serrano Cinca *et al.*, 2003), they are nevertheless under pressure to provide the same success as can be observed in private sector, despite quality being the fundamental goal for public services provided by governments across the world (Wynen *et al.*, 2016). For example, the provision of a high-quality services to residents by reducing costs is more difficult for the public sector, compared with the private sector, indicating that the latter sector is efficient than former.

Although organizations both in the public and private sectors are seeking to outsmart each other by undertaking various quality management initiatives, the private sector is considered to still be ahead in terms of TQM (Krishnan, 2016). A few studies have indicated the possible association between TQM and sustainability performance in the private sector. For example, the effective execution of TQM influences firms' green innovation significantly (Li *et al.*, 2018), which is a vital dimension for sustainability performance (Yu & Huo, 2019). Moreover, Xie *et al.* (2019) stated that firms can introduce environmentally friendly products and services by focusing on processes, which is one of the important components of TQM. On the basis of resemblances among the TQM framework and excellence or organizational performance models, Tasleem *et al.* (2019) proposed the use of TQM models to facilitate organizational sustainability (see also Alharbi *et al.*, 2016). In contrast, very few studies have shown the possible impact of TQM practices on sustainability performance in the public sector. Even though a few studies relating to the public sector have been conducted in the field of TQM and green practices, they have not scrutinized their potential effects on sustainability performance in the public sector. For example, Wynen *et al.* (2016) examined the determinants for the use of TQM techniques in the public sector and found that organizational autonomy and result control lead to negative results. Further, Xie *et al.* (2019) recommended that the government sector effectively implement green technology innovation to improve its financial performance. However, the results of studies in private sector organizations can be generalized to public-sector-related literature in terms of hypothesizing that the efficient adoption of TQM and green environmental practices are crucial for improved public service delivery and sustainability performance (Wynen *et al.*, 2016; Xie *et al.*, 2019). In view of this, this study argues that TQM has a direct impact on the sustainability performance of public sector organizations.

1 However, most empirical literature in the field of TQM and sustainability performance has
2 only emphasized a single dimension of sustainable performance: the economic dimension. In
3 this context, several empirical studies have examined the connection between TQM practices
4 and financial performance or organizational performance (Dahlgaard-Park *et al.*, 2018;
5 Nawelwa *et al.*, 2015). For example, Nawelwa *et al.* (2015) found that TQM represents a firm's
6 strategy for enhancing performance by delivering high quality products, services, and
7 processes. In contrast, regarding the social dimension of sustainability, relatively few studies
8 have examined the relationship between TQM applications and stakeholder benefits (Abbas,
9 2020; Lo & Chai, 2012). Concerning environmental performance, some empirical studies have
10 found the TQM system's contribution toward environmental performance, such as green
11 innovation (Li *et al.*, 2018; Zhu *et al.*, 2013). However, very few studies have empirically
12 investigated the association between TQM and sustainability performance dimensions, such as
13 economic, social, and environmental sustainability in public sector organizations, which
14 reveals a gap that requires further study.

15 Conversely, the experience of organizations that have adopted TQM, however, has not always
16 been positive in terms of organizational performance (Kearney & Berman, 2018), which also
17 encompasses sustainability performance (Tasleem *et al.*, 2019), with mixed results regarding
18 the association between TQM implementation and organizational performance. Some
19 organizations have not improved organizational performance significantly through TQM (see,
20 for example, Berman, 2015; Boyne & Walker, 2002; Kearney & Berman, 2018; Melkers &
21 Willoughby, 2005; Wynen *et al.*, 2016), whereas others have had a greater success (Al-Dhaafri
22 *et al.*, 2016; Gomes *et al.*, 2019; Mateos-Ronco & Mezquida, 2018). Failure is often perceived
23 as a problem with regard to implementation (Boyne & Walker, 2002) rather than a failure of
24 the theory or principles of TQM (see, for example, Mateos-Ronco & Mezquida, 2018;

Milakovich, 2007). Hence, similar to the private sector, it can be argued that TQM may not always improve sustainability performance in the public sector (Tasleem *et al.*, 2019).

It is not surprising that service innovation, similar to TQM, can also lead to mixed results regarding organizational sustainability. Contemporary organizations offering service products, such as public service sector organizations, are required to execute the relevant effective service innovation strategies and practices in order to: develop scalar business models; monitor staff performance; manage customer experience; provide managerial process innovation (Tsai & Wang, 2017); and, ultimately, enhance sustainability performance (Toivonen, 2016). According to Aas and Pedersen (2010), service innovation has the ability to improve a firm's financial performance (i.e. reduced operational costs and increased profitability), reflecting the dimension of economic sustainability. Furthermore, the relationship between other stakeholders can be changed through service innovation, while also having effects on customer value (Lyons *et al.*, 2007), which is related to social sustainability performance. Løvlie *et al.* (2008) showed that service innovation can have external effects, such as environmental effects (environmental sustainability). Nevertheless, empirical studies investigating these relationships between service innovation and sustainability performance are still lacking, particularly in the context of public sector organizations.

On the other hand, many quality management techniques are required to enhance existing services (Mättö, 2019), implying that TQM could be a better mechanism to produce service innovations. Service innovation is referred to as an innovation that can be seen in numerous scenarios within the service sector that either completely develop new types of services or enhancing existing services (Tsai & Wang, 2017). As highlighted by Ng (2009), innovations and quality management are expected to be interrelated, although empirical studies relating to service innovation and TQM both in the private and public sectors are still lacking in the existing literature.

Regarding the above three constructs (TQM, service innovation, and sustainability performance), very few studies have empirically examined the possible impact of TQM and service innovation on sustainability performance in the public sector, either in developed or developing countries such as the United Arab Emirates (UAE). Moreover, the above-mentioned empirical studies pertaining to the relationship between TQM and sustainability performance (Li *et al.*, 2018; Wynen *et al.*, 2016; Xie *et al.*, 2019), as well as the association between innovation and TQM (Løvlie *et al.*, 2008; Lyons *et al.*, 2007; Toivonen, 2016), indicate that the country is significant, owing to differences in culture and contextual factors. For example, Wynen *et al.* (2016) found that the implications of quality management in public sector organizations within Belgium, Germany, the Netherlands, Italy, Portugal, and Austria are difficult to discern owing to the significant differences across the country cluster and their associated administrative traditions. This is no surprise as country-specific factors that go beyond societal cultures and administrative traditions are expected to influence organizational behaviour (see, for example, Verhoest *et al.*, 2010). Hence, the same notion may be generalizable to the context of the UAE, where a relatively significant difference exists among the country's culture, societal expectation, and other contextual factors, such as political and economic environmental differences, compared to other countries. This implies that the lack of research findings regarding the association between TQM in Abu Dhabi's public sector organizations, service innovation, and their sustainability performance cannot be fulfilled by generalizing the results of prior empirical studies (Li *et al.*, 2018; Xie *et al.* 2019). This highlights the importance of empirically examining the possible effects of TQM application on the sustainability performance of Abu Dhabi's public sector.

The globalized open economy of the UAE, which is trying to compete internationally both to attract foreign investment and be the happiest country in the world (UAE Government, 2019), thus puts tremendous pressures on the country's government to profoundly enhance the quality-

of-service provision in its public sector. The large number of sustainability issues in the UAE emirates such as having the highest energy and carbon footprints in the world, as well as having the highest levels of waste generation and environmental pollution, alongside limited water resources (UAE Government 2020), however, have raised the question of whether the country's public sector organizations are effectively improving their sustainability performance. Consequently, policies and experiments regarding quality and innovation in Abu Dhabi's public services sector, are at the heart of the present enormous economic changes, as well as social developments, across the country.

The government sector of Abu Dhabi, the heart of the UAE federal government and the federal capital of the country (UAE Government, 2020) has traditionally been an implementer and enabler of a varied range of quality management practices (e.g., TQM tools, such as benchmarking, six sigma, and reengineering) and service innovations in administrative development (e.g., smart government), information and communication technologies, and service delivery in an effort to promote quality and improve sustainability performance (Mansour & Jakka, 2013; UAE Government 2020). However, together with TQM efforts and service innovations in administrative development, the public sector of the county including Abu Dhabi's public sector is also engaged in changing the organizational culture, ethos, and mindset of public sector employees to prepare organizational environments for the adoption of quality management, innovations (Ajmal *et al.*, 2016; Mansour & Jakka, 2013), and sustainability performance (UAE Government, 2020), both now and in the future. All these efforts in the Abu Dhabi's public sector are, however, in their emerging stages, thus requiring empirical investigation of how their TQM practices can lead to public service innovation and, subsequently, sustainability performance.

Extant TQM and innovation literature has highlighted the need to investigate the methods for delivering enhanced organizational efficiency in the public sector that synthesizes quality

improvement and a path towards innovation generation (Mättö, 2019; Tasleem *et al.*, 2019). One promising alternative could hence be a TQM method accompanied by service innovation creation, showing the necessity of empirically investigating both applications in relation to sustainability in the public sector. The lack of empirical evidence in the extant literature also implies the necessity of conducting novel studies to simultaneously investigate the relationships between TQM, service innovation, and sustainability performance. The above discussions lead to questioning whether the efforts of the public service sector organizations of Abu Dhabi towards the adoption of TQM practices in fact improve their sustainability performance through service innovation.

1.3 Research Objectives

The present study seeks to address the following three research objectives:

1. Investigate whether TQM within the Abu Dhabi's public sector significantly and positively affects its sustainability performance.
2. Examine the relationship between TQM and service innovation within the Abu Dhabi's public sector organizations.
3. Scrutinize whether TQM in the Abu Dhabi's public sector can improve its sustainability performance through service innovation.

1.4 Research Questions

The present study seeks to answer the following three research questions:

1. Do TQM applications within the Abu Dhabi's public sector significantly and positively affect its sustainability performance?
2. Is TQM in Abu Dhabi's public sector a source of service innovation within the Abu Dhabi's public sector organizations?

3. Does service innovation in the Abu Dhabi's public sector mediate the relationship between TQM and sustainability performance?

1.5 Definitions of Key Terms

Total quality management (TQM) is defined as “a management philosophy that emphasizes the involvement and commitment of all employees throughout the entire organization to provide high-quality products and services and fulfil customer expectations” (Amin *et al.*, 2017, p. 1258). This study argues that TQM is a comprehensive improvement philosophy that can be utilized to gain organizational competitive advantage through the efficient use of resources. Continuous improvements can be accomplished through external and internal quality improvements (Nguyen & Nagase, 2019).

TQM models, which many organizations today espouse, comprise quality award models, such as the Malcolm Baldrige National Quality Award (MBNQA), the European Foundation for Quality Management (EFQM) model, and the Abu Dhabi Award for Excellence in Government Performance (ADAEP) model, aiming both to recognize the success of TQM implementation and to evaluate their business performance (Fatima & Mahaboob, 2018; Özmen *et al.*, 2017). These models are based on many TQM principles, including leadership, strategic planning, customer relationship management, partnerships and resources, product and service design, process management, and employee management. In this study, the ADAEP model is used as the TQM model since it has been used by UAE public organizations since 2016.

The ADAEP model aims to encourage and develop quality performance within the Abu Dhabi's government departments and the wider public sector to accomplish the highest possible standards of public sector performance in the emirate (ADAEP, 2007; Fatima & Mahaboob, 2018). It intends to enhance the continuous improvement of organizations through

five principles: leadership; people; strategy and policy; partnerships and resources; and processes.

Service innovation is defined as “a new or considerably changed service concept, client interaction channel, service delivery system or technological concept that individually, but most likely in combination, leads to one or more new or renewed service functions that are new to the firm and change the service/good presented on the market and do require structurally new technological, human or organisational capabilities of the service organisation” (Hertog, 2000, p. 507). In brief, service innovation can generally be in the form of service concepts, client interaction channels, service delivery systems, or technological concepts.

Sustainability refers to the long- term maintenance of systems in accordance with economic, environmental, and social considerations (Abbas, 2020, Calabrese *et al.*, 2018). The sustainability performance field addresses suitable response and performance paradigms regarding economic, social, and environmental responsibilities in relation to products, services, processes, development, and organizational performance. These three dimensions, known as the TBL model for corporate social responsibility (CSR) are widely used to measure organizational sustainability performance.

Environmental sustainability refers to the efficient utilization of energy and other resources and the footprint organizations leave behind as a consequence of their operations (Hammer & Pivo, 2017). It is often related to pollution reduction, waste reduction, energy efficiency, a decline in the consumption of harmful/toxic/hazardous materials, carbon dioxide emissions reduction, a reduction in the incidence of environmental accidents, etc. (Crane *et al.*, 2017; Junior *et al.*, 2018).

Social sustainability, on the other hand, shifts the focus both to internal (i.e. employees), as well as external communities. Socially sustainable organizations intend to provide equitable

opportunities, promote connectedness outside and within the community, encourage diversity, offer democratic processes along with an accountable governance structure, and ensure/improve the quality of life (Junior *et al.*, 2018).

Economic sustainability concerns with the influence of organizational business operations and practices on the economic system (Crane *et al.*, 2017). In this study, economic sustainability is defined as performance pertaining to organizational financial aspects, such as revenue and production, administrative, and other costs (Hammer & Pivo, 2017).

1.6 Significance/Importance of the Study

The significance of this study is threefold. First, this study seeks to address the identified gap in the literature with regard to the association between TQM and sustainability performance, which is still lacking (Tasleem *et al.*, 2019). A few studies have examined the possible impact of TQM on sustainability performance in the private sector (Yu & Huo, 2019; Xie *et al.*, 2019). However, most empirical studies conducted regarding TQM and sustainability performance have only emphasized a single dimension of sustainable performance (economic, social, or environmental) (e.g., Nawelwa *et al.*, 2015). Also, there are very few studies that have empirically investigated the association of TQM and sustainability performance indicators in the specific context of Middle East countries, such as the UAE, where sustainability issues (e.g., diminishing natural resources and environmental pollution) have become increasingly important (Wyman, 2018). Additionally, the results relating to how TQM contributes to organizational performance, which is also considered a sustainability performance indicator (economic sustainability) (Adams *et al.*, 2014), have been inconsistent. As discussed in Section 1.2, it is evident that findings regarding the relationship between TQM and performance in public sector organizations are inconsistent. For example, while several studies have shown that TQM has a direct and positive impact on organizational performance (e.g., Al-Dhaafri *et*

1 *al.*, 2016; Gomes *et al.*, 2019; Mateos-Ronco & Mezquida, 2018), other studies have argued
2 that no such relationship exists (e.g. Berman, 2015; Kearney & Berman, 2018; Boyne &
3 Walker, 2002; Melkers & Willoughby, 2005; Wynen *et al.*, 2016). Moreover, country-specific
4 factors are also considered crucial determinants in ascertaining the possible association
5 between TQM and sustainability performance in the public sector (Wynen *et al.*, 2016),
6 therefore discouraging the generalization of the results of previous studies to the context of the
7 sustainability of [public sector of the UAE, such as the public sector of Abu Dhabi, which is the](#)
8 [federal capital of the country](#). Accordingly, this study attempts to bridge these gaps by
9 investigating TQM and sustainability performance in the [Abu Dhabi's](#) public sector.

10 Second, there is a marked lack of empirical studies examining the association between TQM,
11 service innovation, and sustainability performance. However, the literature highlights the
12 necessity of understanding the association between TQM-based innovation, organizational
13 excellence, and organizational sustainability within public sector organizations. According to
14 Mättö (2019), integrating quality improvement through TQM with innovation generation as a
15 potential source of efficiency for organizations in public sector has received little research
16 attention. Hence, this study will contribute to this under-researched area by investigating how
17 TQM can enhance service innovation in [Abu Dhabi's](#) public sector's organizations and,
18 ultimately, enhance their sustainability performance.

19 Third, the study is expected to provide the UAE public sector's organizations' policymakers
20 and other relevant professionals in the field of TQM and innovation with an in-depth
21 understanding of how TQM applications can productively enhance service innovation and the
22 public sector's sustainability performance. Although the UAE government is involved in a
23 varied range of TQM initiatives (e.g., benchmarking, six sigma, and reengineering), service
24 innovations pertaining to administrative development (e.g., smart government), and service
25 delivery in an effort to promote quality in public sectoral services and improve their

sustainability performance, they are in emerging stage (Mansour & Jakka, 2013), thus requiring robust research to assess the effectiveness of such efforts. In 20015, the UAE federal government took a significant step in sustainable development by signing up to the United Nations' Sustainable Development Goals framework (Wyman, 2018). The country has contributed to substantial advancement since then by adjusting its National Agenda, creating dedicated governance, and deploying various initiatives for improving sustainability in the country. However, growing sustainability concerns, such as the exploitation of natural resources, limited resources, rapid population growth, high energy consumption, land degradation and desertification, waste generation, and high environmental pollution (e.g., beach pollution from oil spills) (CIA, 2017) require public sector authorities to understand the best ways of overcoming such sustainability concerns through TQM and service innovation. Hence, the findings of this study will significantly help the [Abu Dhabi's public sector](#), [Abu Dhabi's federal capital](#), to understand the effectiveness of its TQM applications in the context of service innovations to enhance public sector sustainability performance.

1.7 Assumptions

The first assumption is that the population sample of the study is representative of the eight public organizations operating in [Abu Dhabi's](#) public service sectors (health services, ports and transport, education, digital government, municipality, economic development, police, and land and real estate), which are located in the emirate of Abu Dhabi, the provisional national capital of the UAE. The pursuit of a representative sample is typical when conducting a survey. As specified Bryman and Bell (2015), samples should be selected on the basis of their suitability to the objectives of the research and in accordance with the principles relating to finding a sample representing a wider population, thus acting as a microcosm of the population.

The second assumption is that the public service sector organizations selected for study are closely adhering to the ADAEP model (Fatima & Mahaboob, 2018) to develop and encourage their quality performance and to achieve the highest possible standards for public sector performance in the country. Most of the selected representative government organizations have recently won an ADAEP award (*Khaleej Times*, 2018). These awards exemplify the endeavors of the Abu Dhabi government to “advance institutional performance and enhance its approach towards creating environment conducive to innovation at government entities, to stir up the spirit of innovation and support creative initiatives that are now the main drivers behind achieving government goals efficiently and effectively” (*Khaleej Times*, 2018).

The third assumption is that survey participants (employees working in the eight chosen public service organizations) will respond in a truthful and honest manner. Saunders *et al.* (2016) asserted that a survey ought to be developed and distributed to inspire the participants to respond honestly, without any fear of potential consequences. This study thus employed appropriate steps to protect the anonymity and confidentiality of the survey participants (e.g. designing an anonymous survey questionnaire), while allowing participants to withdraw from the survey at any time. It was also expected that the employees of Abu Dhabi’s public service sector would participate in the survey autonomously as the stay-at-home order was imposed in the country due to the pandemic of COVID-19 (CNBC, 2020), during which time the survey was conducted.

1.8 Dissertation Structure

This dissertation’s chapters cover six key areas: introduction; literature review and theoretical background; research methodology; data analysis and results; discussion of results; and conclusion, including implications of the study and suggestions for future research. The context and structure of these chapters is described below.

1 *Chapter 1: Introduction*

2 This chapter describes the context and the research problem, defines the research setting,
3 discusses the problem statement, aims, objectives, and questions of the study, details the
4 significance of the study, and outlines the structure of the entire dissertation.

5 *Chapter 2: Literature Review and Theoretical Foundation*

6 This chapter discusses the purpose of reviewing the literature with respect to major areas of the
7 study, such as TQM and its determinants, TQM applications in [Abu Dhabi's](#) public sector,
8 service innovation, and sustainability performance. Additionally, it provides a review of
9 previous studies that support this study, leading to the development of hypotheses regarding
10 the relationship between the three constructs of the study: TQM; service innovation; and
11 sustainability performance. Moreover, this chapter discusses the major theories applied to the
12 study: the resource-based view (RBV); and stakeholder theory. Finally, the conceptual
13 framework of the study is illustrated.

14 *Chapter 3: Research Methodology*

15 This chapter addresses the research philosophy, approach, strategy, and design. Additionally,
16 data collection techniques (survey), sampling procedure and sample size, and data analysis
17 techniques [structural equation modelling (SEM)] used in this study are elaborated.

18 *Chapter 4: Data Analysis and Results*

19 This chapter presents the findings of the quantitative data analysis, which was conducted using
20 IBM SPSS and AMOS v.23. It includes a demographic analysis of the respondents, exploratory
21 factor analysis (EFA), confirmatory factor analysis (CFA), the results of reliability and validity
22 analysis, and structural models presenting the relationships between the constructs of the study
23 (TQM, service innovation, and sustainability performance). Furthermore, the findings

regarding the mediating effect of service innovation on the relationship between TQM and sustainability performance are provided. Finally, the results of the hypotheses tests are summarized.

Chapter 5: Discussion

This chapter discusses the results of the study with the purpose of either confirming or rejecting the findings of the data analysis in comparison with the previous empirical findings reviewed in Chapter 2.

Chapter 6: Conclusion, Implications, Limitations, and Further Research Directions

In this chapter, the summary of the entire study is provided, followed by a discussion of the implications of the research, both academic and practical. The limitations of the study are elucidated, followed by the provision of suggestions for future research relating to TQM, service innovation, and sustainability performance.

1.9 Chapter Summary

This chapter has discussed the context of the current study and the research problem, while elaborating the need of address the identified research gap, i.e. the lack of empirical studies concerning the association between TQM, service innovation, and sustainability performance in the context both of developed and developing countries, such as the UAE. It has been noted that very few studies have empirically investigated how TQM affects sustainability performance in the public sector, while similar studies have provided mixed results regarding sustainability performance (economic, social, and environmental sustainability performance) in the private sector. Moreover, this chapter has revealed that limited research exists regarding the relationship between TQM and service innovation, as well as association between service innovation and sustainability performance, despite the theoretically implied critical importance

1 of service innovation both for TQM and sustainability performance. Having defined these gaps
2 in the extant literature and the research problem, this chapter has further outlined the research
3 aim, objectives, and questions, followed by a justification of the significance of this study, both
4 for academics and public sector authorities.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter reviews and discusses theories, concepts, and previous research findings with respect to study's variables, i.e., sustainability performance, TQM, and service innovation. Accordingly, this chapter starts by defining sustainability performance, followed by TQM and its elements. Moreover, service innovation, along with the most relevant studies' findings, is reviewed. The chapter ends with chapter summary, highlighting the key research gaps found in the extant literature.

2.2 Sustainability

Sustainability is defined as the long- term maintenance of systems in accordance with economic, environmental, and social considerations (Abbas, 2020; Adams *et al.*, 2014; Calabrese *et al.*, 2018). The literature suggests that contemporary organizational success encompasses sustainability (Abbas, 2020; Li *et al.*, 2018; Schaltegger, 2011; Tasleem *et al.*, 2019). Sustainability encompasses suitable response paradigms regarding economic, social, and environmental responsibilities in relation to products, services, processes, and organizational performance. Organizations both in private and public sectors are thus seeking to espouse new processes, technologies, and techniques to encourage greater accountability, enhance process efficiency, reduce costs, and improve quality, thus increasing their sustainability performance (Tasleem *et al.*, 2019).

In the present era, dynamic organizations, regardless the type of organization (private or public firms), prefer to follow several strategies and policies at the same time that underpin their overall strategy (Yusr *et al.*, 2017) to support the achievement of the sustainable development

goals (SDGs) in an effective and efficient manner (Abbas, 2020). According to United Nations' Brundtland Commission report, organizational development will lead to sustainable development if it meets the current generation's needs without compromising the ability of future generation to meet their own needs (cited in Abbas, 2020). This definition specifies the value both of the environment and stakeholders, such as natural resources (especially non-renewable ones) and future generations, and signifies that to attain sustainability, firms must behave more ethically and value them. Environmental degradation, resource constraints, climate change, air pollution, increasing energy consumption, raw materials depletion, waste disposal, rising unemployment, and other social and economic inequalities are prevalent sustainability-related problems in many countries (Abbas 2020; Junior *et al.*, 2018), including the UAE. The need to address these socio-economic and environmental problems and challenges has forced contemporary organizations to pursue SDGs (related to, for example, zero hunger, health, education, climate change, water, energy, gender equality, urbanization, poverty elimination, and environmental and social justice), constituting the global 2030 Agenda for Sustainable Development (Calabrese *et al.*, 2018).

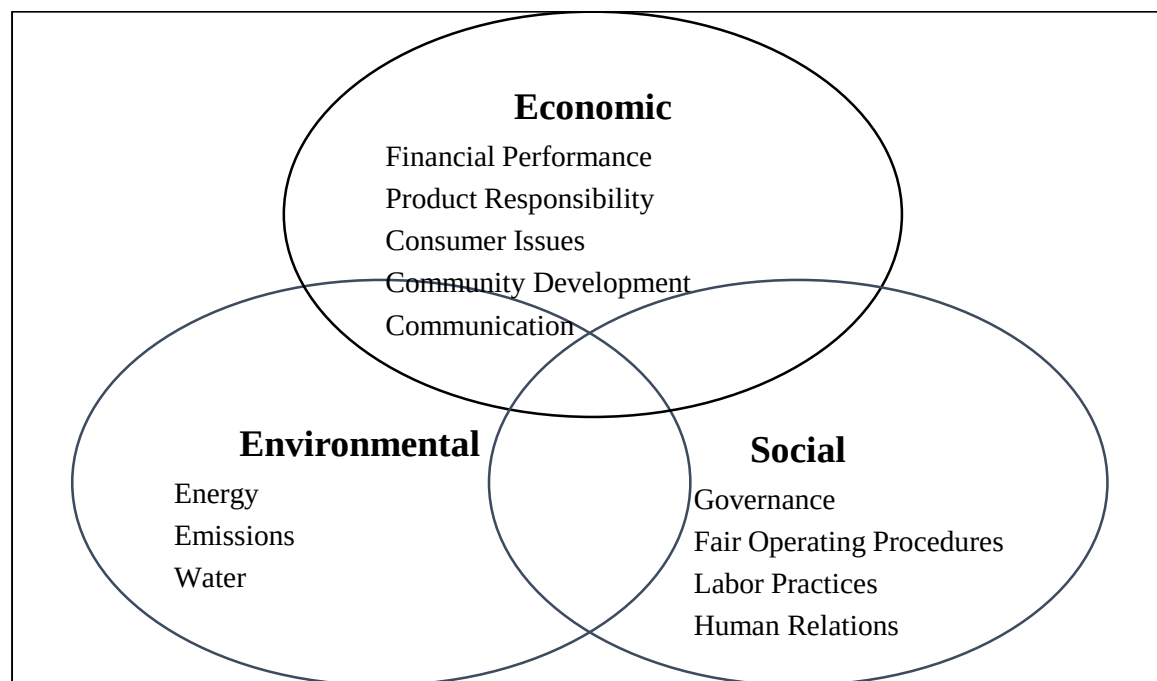
Sustainability consists of three key dimensions or facets: (1) environmental sustainability, which relates to the environment, energy, and natural resources; (2) social sustainability, which concentrates on people, society, governance, and fair operating procedures; and (3) economic sustainability, which emphasizes the organizational financial aspects, such as financial performance and product responsibility (Shahzad *et al.*, 2019; Tasleem *et al.*, 2019). Some studies also interchangeably use the term TBL for these three dimensions in relation to sustainability performance (Abbas, 2020; Calabrese *et al.*, 2018; Tate & Bals, 2018).

Driven by sustainability, the TBL model thus provides a framework for evaluating the performance of business operations and the overall success of the organization based on three aspects or elements (environmental, economic, and social), which are adopted in the present

study to measure sustainability performance. The core notion underpinning the TBL model is thus the measurement of an organization's performance with reference to social justice, economic prosperity, and environmental quality (Figure 2.1) (Crane *et al.*, 2017). Figure 2.1 illustrates three inter-locking circles of the environmental (conservation), social (equity), and economic (growth) dimensions. Hence, sustainable development is fundamentally modeled on these three elements (Crane *et al.*, 2017).

Figure 2.1

Triple Bottom Line (TBL) Model of Sustainability



The economic dimension of the TBL model concerns the influence of organizational business practices and operations on the economic system. Hence, it considers economic capability as a sub-system of sustainability for the survival and development of future generations (Tate & Bals, 2018). At the corporate level, it is operationalized as revenue and production, administrative, and other costs, determining the organizational financial performance (Hammer & Pivo, 2017).

1 In contrast, the social dimension of TBL refers to conducting beneficial and fair business
2 practices by considering human capital, labour, and the community (Shahzad *et al.*, 2019). The
3 premise of social sustainability is that fair and beneficial business practices can offer value to
4 society and the community (e.g., fair wages, employment opportunities, gender equality, etc.).
5 As elucidated by Junior *et al.* (2018), socially sustainable firms aim to promote connectedness
6 both outside and within the community, provide equitable opportunities, ensure/improve the
7 quality of life, encourage diversity, and offer democratic processes alongside an accountable
8 governance structure. Aside from being “good” to the community and society, overlooking
9 social responsibilities is likely to adversely affect a firm’s business performance and
10 sustainability. Studies have revealed that economic costs can also occur as a consequence of
11 disregarding social responsibility (Crane *et al.*, 2017; Hammer & Pivo, 2017).

12 On the other hand, the environmental facet of the TBL model refers to a firm’s engagement in
13 business practices that do not inevitably compromise the ecological or environmental resources
14 for future generations. It is, therefore, linked to pollution reduction, waste reduction, energy
15 efficiency, a decline in the consumption of harmful/toxic/hazardous materials, carbon dioxide
16 emissions reduction, a reduction in the incidence of environmental accidents, etc. (Crane *et al.*,
17 2017; Hammer & Pivo, 2017; Junior *et al.*, 2018). Similar to the social aspect, the
18 environmental facets also impact organizational sustainability. Studies have revealed that
19 environmental initiatives also have the ability to enhance organizational performance, even
20 during periods of economic crisis (see, for example, Chronis & Zombanakis, 2016; Kearney,
21 2009).

22 Accordingly, it is clear that all these three dimensions (economic, social, and environmental
23 sustainability) affect the attainment of SDGs, such as zero hunger, good health and wellbeing,
24 quality education, gender equality, climate change, affordable and clean water and energy,
25 poverty elimination, and environmental and social justice, which are increasingly critical for

contemporary organizations. As elucidated by Larsson and Holmberg (2018), to attain a sustainable future, various societal systems need to be transformed while creating new means for social collaboration. The pursuit of SDGs necessitates large-scale changes in terms of infrastructures, priorities, the practices of socio-economic systems, and other effective strategies, since radical transformations are needed to achieve such ambitious goals (Falcone, 2014). Socio-economic system changes entail cooperation among disciplines, perspectives, and actors (Larsson & Holmberg, 2018), as well as new knowledge creation and application, innovation, and quality management (Markard *et al.*, 2012). While developing countries emphasize international assistance, developed countries tend to focus on the importance both of private and public sector financing to achieve SDGs (Calabrese *et al.*, 2018). In both developed and developing countries, however, the tools for achieving continuous improvements through quality enhancement, the innovation potential of organizations' SDGs, and taking advantage of value creation opportunities are still lacking (Elder *et al.*, 2016). The prevailing competitive business environment, strict global regulations relating to increased customer concern regarding the quality of products, and environmental protection are forcing organizations to pursue strategies for which the effectiveness has been recognized and established, such as TQM. In recent studies, TQM has mostly been considered as a robust tool that has the ability to improve sustainability performance (Abbas, 2020; Li *et al.*, 2018; Tasleem *et al.*, 2019). Accordingly, the literature relating to TQM and its performance outcomes are reviewed in the next section.

2.3 Total Quality Management (TQM)

Since the 1970s, TQM has received considerable attention from researchers. An analysis of the extant literature elucidates that defining TQM is a complex task and therefore there is no single exact definition to fit all organizations. Rad (2006, p. 607) defined TQM as “the development of an organisational culture, which is defined by, and supports the constant attainment of

customer satisfaction through an integrated system of techniques and tools.” In a similar vein, Yeng *et al.* (2018) defined TQM as a management-based approach with the involvement of all members of a firm in advancing products, services, processes, and the culture to accomplish higher levels of satisfaction among customers and other related stakeholders. Androwis *et al.* (2018), on the other hand, referred to TQM as a widely used quality management method incorporating steps to attaining results with zero defects. Amin *et al.* (2017, p. 1258) defined TQM as “a management philosophy that emphasizes the involvement and commitment of all employees throughout the entire organization to provide high-quality products and services and fulfil customer expectations.” Accordingly, TQM can be regarded as an approach to doing business that attempts to maximize an organization’s competitiveness via continual improvement in respect of the quality of its products, services, processes, people, and environments (Androwis *et al.*, 2018; Goetsch & Davis, 2010; Yeng *et al.*, 2018).

Moreover, recent definitions of TQM also emphasize that it is related to organization-wide efforts to create and make permanent a setting in which a firm continuously advances its ability to offer high-quality products and services to customers (Pambreni *et al.*, 2019; Silva *et al.*, 2017). The TQM philosophy offers an overall concept that promotes continuous improvement in firms. Continuous improvements can be accomplished through external and internal quality improvements (Nguyen & Nagase, 2019). Thus, TQM enables a culture of continuous improvement through which successful organizations attempt to meet customers’ expectations regarding quality, both to increase customer satisfaction and improve organizational sustainability performance indicators (Adams *et al.*, 2014).

Based on the above discussion, it is thus fair to argue that TQM is a comprehensive improvement philosophy that can be utilized to gain organizational competitive advantage over other organizations via the efficient use of resources, which therefore encompasses sustainability performance. Hence, defining quality is clearly required for an approach that

1 considers overall quality as an ultimate outcome, such as sustainability performance, related to
2 the typical functioning of the organization (Pimentel & Major, 2016). As a business
3 management approach, TQM also enhances the quality of organizational management, adds
4 value for the customer, boosts competitiveness, and provides a competitive advantage for the
5 organization (Bajaj *et al.*, 2018; Lee *et al.*, 2010). Different studies have shown numerous
6 organizational outcomes of TQM. Table 2.1 provides a synthesis of the literature pertaining to
7 TQM.

Table 2.1

Synthesis of the Literature Pertaining to TQM

Author(s)	Variables and Method	Findings	Recommendations
Wynen <i>et al.</i> (2016)	Quality standards; quality management systems; public sector performance. Public sector organizations from six EU countries: Belgium; Italy; Portugal; Germany; the Netherlands; and Austria.	Managerial autonomy and external result control lead public sector organizations to use quality management techniques. Finally, the empirical results show that the country matters. Based on differences in significances of the country dummies, country clusters based on administrative tradition could clearly be distinguished.	Organizations with increased levels of managerial autonomy and result control will automatically provide better services through, for example, the use of quality management techniques, which should be refined to improve public sector organizations' performance.
Psomas and Jaca (2016)	TQM dimensions; performance dimensions. A survey of the service industry in Spain.	Performance dimensions are affected by a limited number of TQM factors. For instance, operational performance, product/service quality, and customer satisfaction are affected by only two of the five TQM factors;	By focusing on specific TQM factors, a service firm can improve its performance dimensions. In doing so, it can lay the foundations not only to survive but to be competitive in the current global

Author(s)	Variables and Method	Findings	Recommendations
		however, financial performance is impacted by only one TQM factor.	scenario, which is characterized by an economic downturn.
Utami and Harahap (2019)	Critical success factors (CSFs) of TQM and performance outcomes. Public service sector in Indonesia by drawing on employee and management perceptions.	The results indicate that leadership is a key factor that can drive performance improvement. The other critical success factors that drive services quality are continuous improvement, customer focus, and operational performance.	Managers in public organizations must realize that it is imperative for them to enhance their leadership as is it essential for effective quality improvement.
Khalili <i>et al.</i> (2019)	TQM soft dimensions (STQM); sustainable performance; quality management standard (QMS). A total of 329 primary data collected from numerous Malaysian industries.	STQM fully mediates the relationship between QMS and sustainability performance.	The industrial sectors of Malaysia should focus more on TQM's soft dimensions than its hard dimensions.
Tasleem <i>et al.</i> (2019)	Corporate sustainability performance (CSP); dimensions of CSP (economic, social, and environmental sustainability	Statistical results reveal that TQM does not only significantly impact corporate sustainability performance but also has an impact on each of its	The study outcomes draw attention of the corporate boards and the country's executive leadership regarding the execution of the most

Author(s)	Variables and Method	Findings	Recommendations
	performance); technology management. Survey-based empirical research using 209 multifaceted business organizations in developing countries.	dimensions (social, economic, and environmental sustainability performance), whereas TQM has an insignificant direct effect on CSP and impacts the economical sustainability dimension only.	highly ranked components of sustainability performance in connection to quality and TQM practices. Local organizations are more focused on the economic sustainability dimension; however, the benefits of economic stability can be used to improve environmental and social sustainability performance with sufficient focus on technology advancement and TQM culture and practices.
Shafiq <i>et al.</i> (2019)	Organizational performance (financial and non-financial); TQM elements such as leadership, strategy, partnership, processes, and people.	TQM has a highly positive impact on organizational performance. This supports the divergence argument, which indicates that the positive effect of TQM on organizational performance is not limited only to firms located in developed nations,	Among TQM's elements, the hard elements, such as "processes" and "partnerships and resources," have the most positive relationships with non-financial results, whereas the soft elements, such as "people," do not have a significant relationship

Author(s)	Variables and Method	Findings	Recommendations
	A survey conducted in the textile industry of South Asia.	but can also be equally achieved in other parts of the world.	with financial and non-financial results. This does not indicate, however, that soft TQM elements do not have any association with business results.
Abbas (2020)	TQM; corporate sustainability; knowledge management. Medium and large sized organizations from manufacturing and services firms located in Pakistan.	The results indicate that TQM has a significant and positive impact on customer satisfaction and that quality management partially mediates the relationship between them.	The significance of institutionalizing TQM practices in organizations and their important role in ensuring corporate sustainability is highlighted. Thus, the management and leadership of organizations should enhance their commitments to implementing TQM practices within the organization so that not only can economic sustainability be achieved, but also environmental and social sustainability.

As shown in Table 2.1, TQM is considered an integrated management philosophy that is imperative both for public and private organizational performance dimensions. For example, Wynen *et al.* (2016) found that quality management is vital for organizational performance in public sector organizations in EU countries, while Psomas and Jaca (2016), Khalili *et al.* (2019), and Tasleem *et al.* (2019) found the same in private sector in Spain, Malaysia, and developing countries, respectively. The findings of such studies may not, however, be generalizable to other countries as the results seem to show that the country matters (Wynen *et al.*, 2016). Moreover, studies have also found that sustainability performance is an organizational outcome resulting from TQM in different countries, including developing countries (Abbas, 2020; Khalili *et al.*, 2019; Tasleem *et al.*, 2019). In contrast, however, several studies have shown that different elements affect performance outcomes. For example, Shafiq *et al.* (2019) found that various elements of TQM, such as leadership, strategy, partnerships, processes, and people, have diverse impacts on organizational performance in the private sector, whereas Utami and Harahap (2019) found that leadership is a key factor that can drive performance improvement in the public sector, alongside other critical success factors that drive services quality, such as continuous improvement, customer focus, and operational performance.

Given the profound implications of TQM on an organization's ultimate outcomes, such as organizational and sustainability performance, it is necessary to understand its principles or elements in order to ensure successful implementation. Hence, the next section reviews the principles/elements of TQM.

2.4 Elements of Total Quality Management (TQM)

There is no consensus regarding the elements constituting TQM, with different elements defined by different researchers (Corredor & Goni, 2011; Yeng *et al.*, 2018). For instance,

1 according to Zehir *et al.* (2012), there are eight TQM dimensions that positively contribute to
2 organizational performance: continuous improvement; leadership management; customer
3 focus; employee management; fact-based approach to decision making; supplier management;
4 system approach to management; and process management. In contrast, Yeng *et al.* (2018)
5 argued that organizational performance is affected by heterogeneous TQM elements, such as
6 strategic planning, leadership, process management, product and service design, the quality
7 management of suppliers, customer relationship management, employee management, the
8 collection and analysis of information.

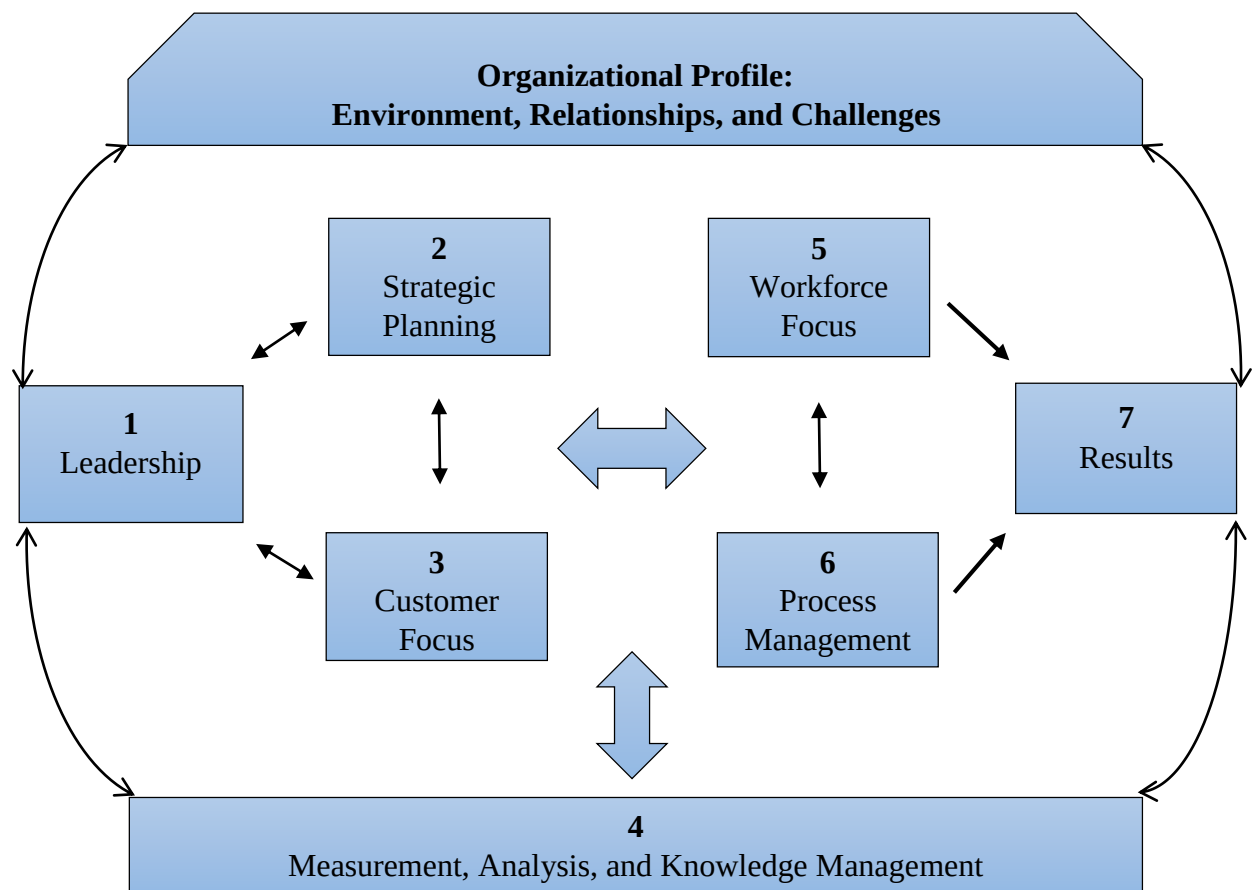
9 On the other hand, many organizations today also use quality award models (e.g. MBNQA,
10 EFQM, and ADAEP) in relation to recognizing the critical success factors of TQM
11 implementation, as well as their business performance evaluation (Fatima & Mahaboob, 2018).

12 The MBNQA is currently considered the most widely accepted service excellence standard,
13 which is measured through dimensions encompassing leadership, strategic planning, customer
14 focus, workforce focus, informational analysis and knowledge management, and process
15 management (Figure 2.2). According to Vokurka *et al.* (2000), the MBNQA is primarily based
16 on the central principles of TQM's framework for performance excellence. Lau *et al.* (2004)
17 asserted that implementing MBNQA can facilitate the adoption of TQM practices both in
18 private and public sector organizations, resulting in superior performance and improved
19 competitiveness. The EFQM model, on the other hand is a framework widely used in Europe
20 and has become the basis for several national quality awards. It is based on various principles,
21 including leadership and constancy of purpose, customer focus, management by processes and
22 fact, people development and involvement, partnership development, continuous learning,
23 innovation and improvement, CSR, and results orientation (Özmen *et al.*, 2017). The EFQM
24 model is a non-prescriptive framework recognizing many approaches to realizing sustainable
25 excellence. However, very few studies exist that focus specifically on the MBNQA and EFQM

models in relation to organizational and sustainability performance in developing countries, such as the UAE.

Figure 2.2

TQM Dimensions: MBNQA Criteria for Performance Excellence



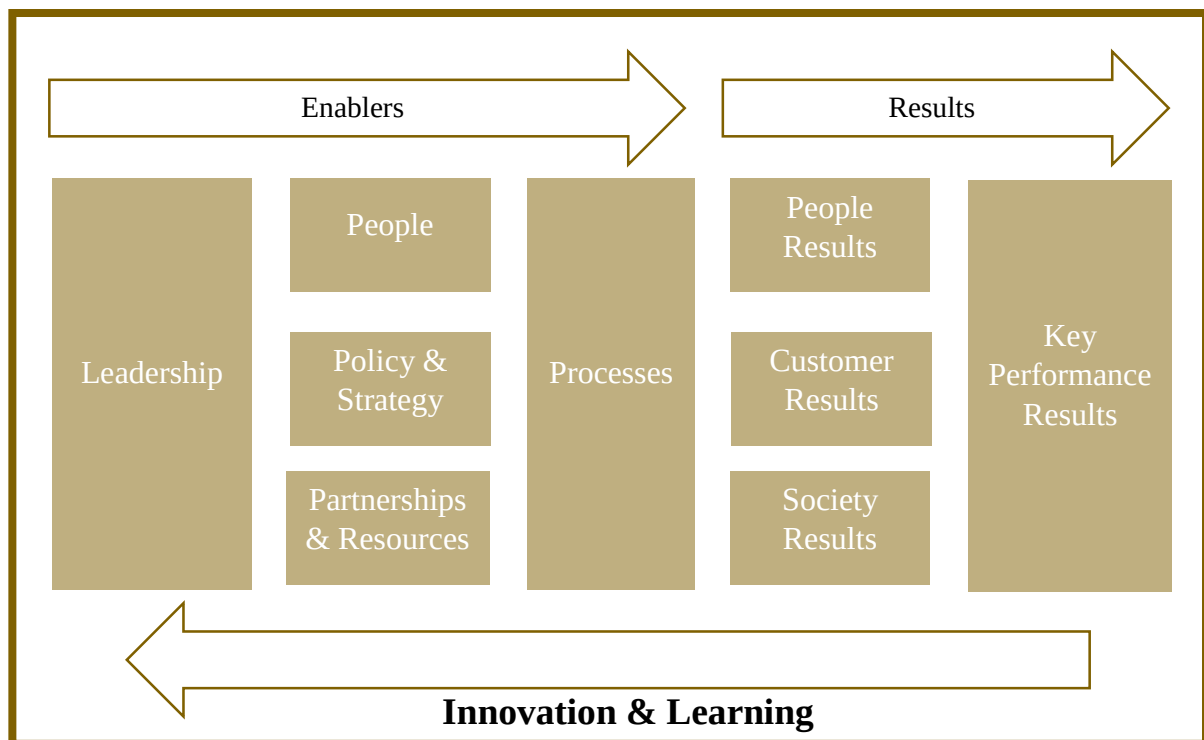
Source: Fatima and Mahaboob (2018).

Unlike the MBNQA, the ADAEP model aims to encourage and develop quality performance within the Abu Dhabi's government departments and the wider public sector and to achieve the highest possible standards of public sector performance in the emirate (ADAEP, 2007) (Figure 2.3). The ADAEP model was initially introduced in 2006 by the Abu Dhabi government through Resolution No. 45. It was first initiated by H. H. General Sheikh Mohamed bin Zayed al Nahyan, Crown Prince of Abu Dhabi, and Chairman of the Executive Council, Deputy Supreme Commander in Chief of the UAE Armed Forces (Public Sector Excellence,

2016). The creation of the ADAEP awards is a part of Abu Dhabi's national strategic plan and is one of the mechanisms through which the country believes that its public service sector can attain top-five ranking globally (Public Sector Excellence, 2016). It highlights the critical importance of TQM dimensions such as leadership, strategy and policy, partnerships and resources, and processes for public sector performance in Abu Dhabi, UAE, with outcomes related to people, customers, society, and performance.

Figure 2.3

The ADAEP Model for Public Sector Performance Excellence



Source: ADAEP (2007).

It is clear that the dimensions of TQM models, such as the MBNQA, EFQM, and ADAEP models, are also embedded in several prior studies, including, for example, those of Yeng *et al.* (2018) and Zehir *et al.* (2012). Accordingly, the different elements/dimensions of TQM highlighted above are summarized in Table 2.2.

1 **Table 2.2**

2 *Heterogeneous TQM Elements*

TQM Elements	Other Terms
Leadership	Top management support
	Leadership and management commitment
	Top management/Leadership
	Management leadership
	Management commitment
	Leadership
Strategic planning	Quality system
	Benchmarking
Customer relationship management	Customer relations
	Customer focus
Process management	Continuous improvement process
	Process management
	Quality culture
	Statistical and quality tools
Suppliers' quality management	Supplier relationships
	Supplier management
	Supplier focus
	Supplier quality
	Supplier involvement
Product and service design	Product/Process design
	Design management
	Product/Service design
Employee management	Employee involvement
	Employee relation
	Human resource focus

3 **Source:** Barouch and Kleinhans (2016), Elshaer and Augustyn (2016), Wu (2015), and Yeng

4 *et al.* (2018).

2.5 Service Innovation

In today's business setting, service organizations must continuously renew their operations, processes, and offerings to ensure competitiveness. Innovation is referred to as the commencement, adoption, and implementation of ideas that are new to an organization, thus involving recognizing and capitalizing on opportunities to create new products, services, processes, etc. (Miranda *et al.*, 2016). Service innovation can thus be defined as innovation that can be seen in numerous scenarios within the service sector that involve developing completely new types of services or improving existing services. Hertog's (2000, p. 507) broad definition of service innovation is "a new or considerably changed service concept, client interaction channel, service delivery system or technological concept that individually, but most likely in combination, leads to one or more (re)new(ed) service functions that are new to the firm and do change the service/good offered on the market and do require structurally new technological, human or organizational capabilities of the service organization."

Service innovation functions as an engine of economic growth and permeates all related service sectors. Stimulated by an emphasis on innovation, service organizations have grown enormously over the last decade (Hanif & Asgher, 2018). Examples of the growth relating to service innovation include: internet services (e.g. industrial giants like IBM and social media such as Twitter and Facebook), which have re-energized their competitive position by focusing more on customer service; restaurants (e.g. Starbucks) and other retailers (e.g. Amazon and eBay), which have re-defined their business model by facilitating new customer experiences; and smart government services relating to education, health, transportation, finance and banking, municipality operations, etc. This tremendous growth in service innovation has also been reflected in the social services sector, with innovations targeting the under-privileged and the public service sector (Snyder *et al.*, 2016).

1 The literature suggests that fruitful innovation cannot occur without the application of new
2 market knowledge, business models, and technological knowledge that can bring higher-value
3 service offerings to customers who are purchasing at prices that can provide profits (Forsman,
4 2015; Snyder *et al.*, 2016). Forsman and Temel (2011) also asserted that the use of innovation
5 has shaped various opportunities for service-based organizations not only to advance their
6 current business operations, practices, and competitive advantage but also to develop new
7 services and processes and to achieve higher business growth performance. Lusch and
8 Nambisan (2015) elucidated that, with strong service innovation, organizations in a competitive
9 business environment can establish their market position and augment their performance by
10 generating value for customers. Several other studies have found that service innovation has
11 the ability to improve organizational performance (Snyder *et al.*, 2016). Table 2.3 summarizes
12 some of the key studies that have examined service innovation practices and that are relevant
13 to the current study

Table 2.3

Synthesis of the Literature Pertaining to Service Innovation

Author	Purpose	Variables and Method	Findings
Snyder <i>et al.</i> (2016)	To investigate and explore how service innovation is defined and used in research.	An extensive and systematic review of 1,046 academic articles.	Results identify four unique service innovation categorizations emphasizing the following traits: 1) type of change; 2) degree of change; 3) newness; and 4) means of provision. The results show that most research focuses inward and views service innovation as something (only) new to the firm. Interestingly, service innovation categorizations appear both to neglect customer value and financial performance.
Grawe <i>et al.</i> (2009)	To determine how a firm's strategic orientation affects service innovation capability and the resulting impact on market performance.	Customer orientation; competitor orientation; cost orientation; service innovation; and market performance. A survey using supply chain executives in China.	Even though the relationship between cost orientation and service innovation is not supported, the relationships between customer orientation and competitor orientation and service innovation are supported. Additionally, the relationship

Author	Purpose	Variables and Method	Findings
			between service innovation and market performance is supported.
Lin (2013)	To examine the impact of service innovation on performance in developing countries such as China.	Service innovation; service quality; and performance. A survey using 277 samples in the Chinese tourism sector.	First, service innovation affects firm performance through direct and indirect paths where service quality plays a positive mediating role, and the direct impact is larger than the indirect one. Second, the innovation mode is cost-reductive, which focuses on eliminating internal costs rather than improving service quality. Third, the assessment of service quality emphasizes the dimensions of assurance and reliability.
Ferraz and de Melo Santos (2016)	To analyze studies addressing the concepts of innovation in services and performance in conjunction with organizational research.	A bibliometric study was carried out among administration journals with impact factors greater than or equal to 0.8. The studies mainly focus on clusters, the theme of strategy, and issues such as market	The diversity among the articles analyzed suggests there is no consolidated theoretical framework underpinning them. Future research agendas are proposed, highlighting the need for investigations that consider the customer in the relationship between service innovation and performance.

Author	Purpose	Variables and Method	Findings
		orientation, performance, management, and product development.	
Hanif and Asgher (2018)	To empirically examine the relationship between service innovation and service innovation performance.	Typology of service innovation based on new service offerings/products; new service processes and new service business models are tested for their likely effect on service innovation performance. Cross-sectional self-administered survey from a sample of 220 managers from banking organizations.	Results show the strong impact of multi-dimensional service innovation on service innovation performance. Each dimension of service innovation significantly predicts service innovation performance.
KanKam-Kwarteng <i>et al.</i> (2019)	To provide a framework to explain the role of service innovation in the relationship between	Service innovation; customer orientation; firm performance.	The study demonstrates that customer orientation and service innovation contribute significantly to the performance of small to medium-sized enterprises. However, service innovation partially mediates the relationship

Author	Purpose	Variables and Method	Findings
	customer orientation and firm performance.	Surveying 142 participants from small and medium-sized auto service operators in Ghana.	between customer orientation and firm performance.

Despite the inevitable importance of service innovation in organizational performance, empirical studies investigating service innovation and its influence on organizational sustainability are still lacking (Snyder *et al.*, 2016). This is further supported by Grawe *et al.* (2009), who claimed that service innovation has been widely discussed from a conceptual perspective, but that empirical studies are scarce. In their literature analysis, Calabrese *et al.* (2018) also pointed out that research specifically focusing on service innovation in relation to sustainability is still scarce and is scattered across different fields of research. Thus, only limited implications are available for organizations, particularly the public service sector, which prefers to address sustainability issues and challenges via service innovation. Service innovation is, however, increasingly understood as a route to sustainable growth, as well as a source of competitive advantage at the level of the firm, the industry, and the economy, both in the private and public sector (Randhawa & Scerri, 2015). Hence, this study helps bridge this gap in the literature by examining the impact of service innovation on sustainability performance in the public sector.

2.6 Chapter Summary

This chapter reviewed the literature with respect to the study's key variables such as TQM, service innovation, and sustainability performance. The dynamic business environment, strict global relating to product quality and environmental concerns are forcing both public and private sector organizations to follow strategies such as TQM for which the effectiveness has been established. Recent studies show that TQM has been considered as a robust tool to enhance sustainability performance (e.g., Abbas, 2020; Li *et al.*, 2018; Tasleem *et al.*, 2019). Moreover, such findings are varying depending on the country as well as the sector (Wynen *et al.*, 2016). Additionally, different studies have found that mixed results are found with respect to the effect of TQM elements (e.g., leadership, strategy, resources and partnership, people etc.) on the organisational outcomes, such as sustainability. On the other hand, the inevitable

1 importance of service innovation in organizational performance was reviewed in this literature
2 review. However, it was found that empirical studies investigating service innovation and its
3 influence on organizational sustainability are still lacking (Snyder *et al.*, 2016; Grawe *et al.*,
4 2009). Having reviewed such gaps in the extant literature, the next chapter aims to discuss
5 theoretical foundation and hypotheses of the study.

CHAPTER 3: THEORETICAL FOUNDATION AND HYPOTHESES

DEVELOPMENT

3.1 Introduction

This chapter discusses theoretical framework and hypotheses relating to the study's key variables, that are TQM, sustainability performance, and service innovation. First, theories adapted by the current study, such as resource-based-view and stakeholder theory and their relevance are discussed. Second, the hypotheses linking concepts such as TQM, sustainability performance, and service innovation are developed and discussed with respect to the findings of the previous study. Finally, the chapter concludes by describing the research framework adopted in the current study and the hypotheses.

3.2 Theories

Investigating the relationships between TQM's elements, service innovation, and sustainability performance entails a careful examination of the important theories underpinning quality management, innovation, and sustainability. In this study, two theories, namely RBV and stakeholder theory, are applied to understand the effect of TQM and service innovation on a firm's sustainability performance from the perspective of diverse schools of thought. As empirically confirmed by Chen *et al.* (2019), Mendes and Dias (2018), Johnsen *et al.* (2017), and Sila (2018), the most extensively applied theoretical perspectives espoused for examining TQM and sustainability performance are RBV and stakeholder theory, which are described in the following sub-sections.

3.2.1 Resource-Based View (RBV)

RBV asserts that organizational competitive advantage is derived from the internal resources and capabilities at its disposal. It argues that competitive advantage can be attained by ensuring

1 that a firm's resources are valuable, rare, inimitable and non-substitutable (VRIN) (Nair &
2 Markowski, 2016). As argued by Johnsen *et al.* (2017), RBV has become prevalent as a
3 theoretical lens through which to view sustainability.

4 TQM, being a resource and a strategy, tends to enhance a firm's performance through
5 encouraging the development of specific assets submerged in the firm's culture, which both
6 generate knowledge and socially multifaceted relationships (Maravilhas & Martins, 2019).
7 Moreover, the ability to effectively respond to economic, social, and environmental
8 responsibilities can be a resource or capability that leads to a sustained competitive advantage
9 (Hart, 1995) and, subsequently, sustainability performance. CSR practices embody the greatest
10 opportunities presently available to organizations to achieve greater success through new
11 products, services, and technologies (McWilliams *et al.*, 2002; Xie *et al.*, 2019). Studies have
12 shown that organizations with greater environmental performance also have improved financial
13 performance (Russo & Fouts, 1997). Hence, these characteristics can be related to the fact that
14 firms can achieve sustainability performance through TQM practices that are aligned with
15 corporate social responsibilities.

16 According to RBV theory, by implementing TQM practices, a firm can develop distinct
17 resources (TQM as a corporate asset embedded in the organizational culture of the firm, TQM
18 as a product-design capability, and TQM as a process-improvement capability), which are
19 required for providing innovative services to overcome problems that the public service sector
20 may face (Silva *et al.*, 2017). Hence, it is argued that TQM recognizes the quality-related
21 problems existing in the organizational execution of quality-improvement methods and
22 processes in the public sector as a way to generate ideas on how to address such problems via
23 such service innovations, widely categorized as new service concepts, new clients, new service-
24 delivery systems, and new technological options. Therefore, these improvement ideas, created
25 by managers or employees, are considered in this study to be a potential type of service

1 innovation that can cross intra-organizational boundaries through the involvement of
2 employees from various professional domains.

3 From the perspective of RBV theory, innovation is regarded as playing a vital role in generating
4 value and sustainable competitive advantages (Baregheh *et al.*, 2009). This study thus argues
5 that a firm's service innovation, along with its CSR capabilities, can enhance its sustainability
6 performance. Several direct impacts of service innovation can be seen in the context of
7 sustainability. Service innovation can modify an organizational internal business process, for
8 example, by enhancing service-delivery capacity, which generates sustainable competitive
9 advantages, thus also increasing economic (e.g. operational performance, cost reduction) and
10 social sustainability performance (e.g. customer satisfaction resulting from speedy service
11 delivery).

12 **3.2.2 Stakeholder Theory**

13 Initially, Freeman (1984) integrated stakeholder concepts into a coherent construct by
14 highlighting the role of stakeholders for further academic attention. Stakeholder theory is
15 basically cantered on the stakeholder concept and grouping the stakeholders into categories to
16 provide an understanding of the stakeholder relationships (Freeman, 1984). It states that
17 stakeholders, such as suppliers, customers, local communities, creditors, and environmental
18 authorities, affect (or are affected by) organizational activities.

19 Stakeholder theory is a key element of sustainability performance from the perspective of open
20 systems, in which organizations interact with society and different groups with specific sets of
21 expectations, needs, and demands (Schaltegger *et al.*, 2019). CSR or sustainable development
22 programs should be tailored around these stakeholders' needs and expectations in a strategic
23 way. Hence, this study argues that the effects of TQM practices and service innovations on
24 organizational sustainability performance depend on their alignment with the needs and

1 expectations of the various stakeholders. Since both TQM and sustainability performance take
2 into account the interest both of external and internal stakeholders, TQM approaches are
3 usually considered appropriate strategies to increase organizations' value by achieving
4 sustainable competitive advantages (Mendes & Dias, 2018).

5 Thus, the consideration of stakeholders establishes the importance of the values and moral
6 aspects in managing TQM in the public service sector, for example those aspects related to
7 corporate social responsibilities (economic, social, and environmental) (Mendes & Dias, 2018).

8 Accordingly, this study argues that sustainability performance in the public service sector, with
9 respect to economic, social, and environmental performance, cannot be achieved through TQM
10 applications without also balancing the views and perceptions of stakeholders, such as the
11 community, residents, suppliers, and other government departments and institutions, since their
12 decisions critically affect organizational actions and outcomes.

14 **3.3 Development of Research Framework and Hypotheses**

15 **3.3.1 Total Quality Management (TQM) and Sustainability Performance**

16 According to Kuei and Lu (2013) and Isaksson (2006), TQM as a management strategy aims
17 to enhance customer satisfaction and sustainability performance by providing high-quality
18 products and services through the participation and collaboration of all stakeholders, teamwork,
19 customer-driven quality, and continuously improving the performance of inputs and processes
20 by applying quality management techniques and tools.

21 Most of the previous empirical literature addressing TQM and sustainability performance has
22 only emphasized a single dimension of sustainable performance. Concerning the economic
23 dimension, there are many empirical studies examining the connection between TQM practices

and financial performance or organizational performance (Kassem *et al.*, 2019). For example, several authors have theoretically derived the possible impact of TQM on organizational performance in various ways (Hussain *et al.*, 2019; Mosadeghrad, 2014; Nawelwa *et al.*, 2015). For example, Nawelwa *et al.* (2015) argued that TQM can be considered a firm's strategy to enhance organizational performance by delivering high-quality products, services, and processes. They found that TQM practices can help an organization to improve its performance through teamwork, continuous improvement and training, commitment from management, and employee empowerment. Hussain *et al.* (2019) revealed that TQM practices are significantly connected with innovation and operational performance. Other studies, such as those of Modgil and Sharma (2016) and Sharma and Modgil (2019), have supported the notion that total productive management and TQM practices combined can lead to operational performance, and thus organizational performance. By exploring the critical success factors for TQM, Mosadeghrad (2014) found that sufficient education and training, consistent support from top management, supportive leadership, employee involvement, process management, customer focus, and the continuous improvement of processes are the key determinants of successful TQM implementation, thus leading to operational and organizational performance.

These findings thus denote that a high level of organizational performance is expected to be achieved through TQM by improving customer-driven quality and focus, inputs and processes, teamwork, education and training, management support, and leadership. Suárez-Barraza and Ablanedo-Rosas (2014) argued that, to preserve a quality environment within an organization, amongst other levels, benefits ought to be sought at the levels of productivity improvement, quality improvement, and cost reductions. Accordingly, it can be argued that these characteristics relate to the conditions that enable firms to achieve sustainable development and competitive advantage (Abbas, 2020), and hence economic sustainability and TQM.

1 Although very few studies have empirically investigated the association between TQM and
2 sustainability performance in relation to its economic, social, and environmental dimensions,
3 the relationship between TQM and organizational performance has been widely investigated.
4 However, while some studies have revealed a significant effect on organizational performance
5 (Al-Dhaafri *et al.*, 2016; Dahlgaard-Park *et al.*, 2018; Gomes *et al.*, 2019; Hussain *et al.*, 2019;
6 Mateos-Ronco & Mezquida, 2018; Mosadeghrad, 2014; Nawelwa *et al.*, 2015), other studies
7 have not found any such effect (Berman, 2015; Dahlgaard-Park *et al.*, 2018; Kearney &
8 Berman, 2018; Melkers & Willoughby, 2005; Wynen *et al.*, 2016). Further, Soltani *et al.* (2006)
9 found that the majority of organizations have not achieved any tangible results through TQM.
10 Moreover, the existing literature has also elucidated that only one-third of TQM programs are
11 successful, with the remainder failing mostly owing to the lack of an appropriate culture
12 (Gimenez-Espin *et al.*, 2013), thereby negatively affecting organizational performance. Other
13 previous studies have also found that the lack of organizational culture and organizational
14 structure are the major two reasons for TQM failures (Talapatra & Uddin, 2019; Talapatra *et*
15 *al.*, 2019). Other authors have also stressed that the lack of service innovation can also lead to
16 TQM failure (Mättö, 2019). These studies suggest that organizational performance can be
17 achieved through effective TQM practices.

18 On the other hand, regarding the social dimension of sustainability, many empirical studies
19 have examined the relationship between TQM practices and various stakeholder-benefit
20 aspects, including performance relating to customers, employees, and societies (e.g. customer
21 support and service, customer satisfaction, employee relation, peoples' health and safety, etc.)
22 (Lo & Chai, 2012; Mohanty & Lakhe, 2011; Pimentel & Major, 2016; Talapatra *et al.*, 2018).
23 For example, by reviewing core themes in TQM research area, Lo and Chai (2012) argued that
24 the main success factors for TQM implementation are customer satisfaction and service quality
25 measurement, implying the implications of TQM for customer performance. Furthermore, to

1 achieve business excellence and performance, organizations must establish top-management
2 and leadership support, following four key TQM principles: (1) delighting the customer; (2)
3 people-based management; (3) continuous improvement; and (4) management by fact
4 (Pimentel & Major, 2016). This indicates that successful TQM implementation can provide
5 customers and people with social benefits. Moreover, Mohanty and Lakhe (2011) recognized
6 four primary reasons for promoting TQM: (1) increasing market share and profitability; (2)
7 improving customer satisfaction; (3) improving the quality of work and reducing costs; and (4)
8 improving employee relations. Here, Mohanty and Lakhe's (2011) first reason is related to
9 economic sustainability and TQM, and other three other reasons are related to TQM and social
10 sustainability in terms of customers and employees. Further, Talapatra *et al.* (2018) explained
11 that integrated TQM systems, complying with ISO 9001, ISO 14001, OHSAS 180001, and SA
12 8000, meet the demands of all stakeholders, including customers, employees, and societies, by
13 embedding quality, employees' health and safety, social accountability, and environmental
14 processes in a culture of continuous improvement.

15 Concerning environmental performance, some empirical studies have found the contribution
16 of TQM systems toward environmental performance (Wiengarten & Pagell, 2012; Zhu *et al.*,
17 2013). Li *et al.* (2018) found that the effective implementation of TQM affects firms' green
18 innovation significantly. Empirical evidence shows that firms with TQM implementation in
19 line with ISO 9001, linked with environmental management system ISO 14001, attain more
20 advantages than others (Heras-Saizarbitoria & Boiral, 2013).

21 In contrast, Marefat and Faridfathi (2015) asserted that TQM is a way of employing all the
22 potential capabilities, both of employees and managers, in performing their jobs and managing
23 an organization. According to Androwis *et al.* (2018), TQM practices represent the best way
24 to improve organizational performance via competitive advantage dimensions, such as
25 innovation, delivery and time to market, cost, and price. Thus, such improved competitive

advantages can lead to improved sustainability performance. Tasleem *et al.* (2019), on the other hand, asserted that TQM requires a new working environment to be created so that people are able to acquire and share knowledge, which positively affects sustainability performance. Despite some inconsistent results on the effect of TQM critical success factors on organizational performance, as well as the lack of research in relation to TQM and sustainability performance, the existing literature indicates that the adoption of TQM applications has a positive influence on sustainability performance (Abbas, 2020). Based on the above discussion relating to TQM and sustainability performance, the following hypothesis is posited:

H1: TQM in Abu Dhabi's public sector has a significant and positive impact on its sustainability performance.

As discussed in Section 2.4, the model utilized in the current study to identify the implications of TQM in relation to sustainability performance is the ADAEP model. One of the key reasons for using this model is that the ADAEP model is virtually identical to EFQM model, as both models encompass leadership, people, strategy and policy, partnerships and resources, and processes as the key enablers of TQM in relation to organizational performance (Shafiq *et al.*, 2019). The enabler criteria of the EFQM model are regarded as a TQM model and have been empirically validated by Bou-Llusar *et al.* (2009). Another motivation to apply this model is the fact that it is the most widely used TQM model in the UAE public/government sector (Public Sector Excellence, 2016), which demonstrates the critical importance of investigating how these elements can indeed influence the sustainability performance of Abu Dhabi's public sector.

As a TQM model, the ADAEP model consists of nine elements: five major criteria facilitating the implementation of quality in the Abu Dhabi's public sector organizations (leadership,

people, strategy and policy, partnerships and resources, processes); and four measurement criteria assessing the results of TQM implementation (people results, society results, customer results, key performance results). Since the present study focuses on the possible impact of TQM elements on sustainability performance, the five major critical factors of the ADAEP model are further explained in Table 3.1.

Table 3.1

TQM Elements of the ADAEP Model and Their Possible Outcomes

Elements	Insight
Leadership	“TQM must start at the top, where serious obsession and commitment to quality and leadership need to be demonstrated even if it is true that middle management also has a key role to play in communicating the message” (Oakland, 2011, p. 517). Studies have found that the leadership aspect of TQM has a significant impact on organizational performance (Shafiq <i>et al.</i>, 2019; Utami & Harahap, 2019).
People	Quality management practices, alongside the development of organizational and managerial competencies and information systems, may support cultural changes, leading to business transformation. Indeed, human resource management practices are required to be consistent with the principles and culture both guiding people and the conduct of the organization in order to be accepted and favorably impact TQM implementation (Soltani & Wilkinson, 2020). The critical importance of people as a TQM element has been growing due to the fact that the immediate

	outcomes of TQM execution are connected to employees' work-related attitudes. Hence, it has been stressed that TQM generates positive effects in employees through improving their commitment and satisfaction, and thereby increasing organizational effectiveness (Durairatnam <i>et al.</i>, 2019).
Strategy and policy	Appropriate systems for strategic planning and policies can improve the product and process quality and, subsequently, customer satisfaction (Yeng <i>et al.</i>, 2018).
Partnerships and resources	The partnerships and resources element relates to how the organization plans, organizes, manages, and coordinates its external partnerships (e.g. suppliers, competitors, government) and internal resources to support its strategy and policies, as well as the effective operation of its internal and external processes. Internal and external partnerships and resources should aim to develop long-term objectives, thus creating the basis for mutual investment and cooperation. Partners and resources should address the key requirements for the partnership's success, the channels for regular communication, methods to evaluate progress, and mechanisms for adapting to changing environmental conditions, thus increasing organizational performance (Shafiq <i>et al.</i>, 2019).
Process	A process is an arrangement of interdependent activities that utilize resources, transforming inputs into outputs. Activities in an organization must be managed as an effective process. The importance of the people element as a critical success factor of

	TQM is evident through its ability to enhance value in processes, thereby increasing quality levels and raising productivity (Durairatnam <i>et al.</i>, 2019; Shafiq <i>et al.</i>, 2019).
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Considering Table 3.1, it can be argued that the ADAEP model's TQM aspects can have a positive effect on the performance of sustainability aspects (economic, environmental, and social) in various ways. Previous studies have also shown that TQM elements, such as leadership, people (employee and customer focus), partnerships and resources (supplier focus and partnership development), strategy and policies (strategic planning), and processes, have impacts on organizational performance (Barouch & Kleinhans, 2016; Grawe *et al.*, 2009; Lin, 2013; Yeng *et al.*, 2018; Zehir *et al.*, 2012), which may ultimately lead to sustainability excellence (Özmen *et al.*, 2017). Accordingly, this study proposes the following sub-hypotheses with respect to the dimensions of TQM and sustainability performance in the public sector:

H1a: Leadership positively affects the UAE public sector's sustainability performance.

H1b: People positively affects the UAE public sector's sustainability performance.

H1c: Strategy and policy positively affects the UAE public sector's sustainability performance.

H1d: Partnerships and resources positively affects the UAE public sector's sustainability performance.

H1e: Process positively affects the UAE public sector's sustainability performance.

3.3.2 Total Quality Management (TQM) and Service Innovation

Organizations should simultaneously enhance and innovate existing services, using ambidextrous capacity (Gieske *et al.*, 2016). This subsequently increases organizational innovation capacity. Many quality management techniques, by their very nature, enhance existing services (Mättö, 2019). Service process innovations can be identified as services that are: supporting the administrative core; expanding and supporting customer interfacing processes; supporting functional processes; and supporting inter-organizational processes and operations (Lyytinen & Rose, 2003; Manohar *et al.*, 2019). Service innovations also encompass four dimensions: new service concepts (e.g. new types of public sector services, such as smart government services and smart transportation, that increase residents' satisfaction); new client interfaces (e.g. greater use of self-service for customers/residents visiting government departments, including water and electricity, municipality, road and transportation, health, etc.); new service delivery systems; and new technological innovations (e.g. metro cards facilitating transactions on public transportation services) (Hertog, 2000).

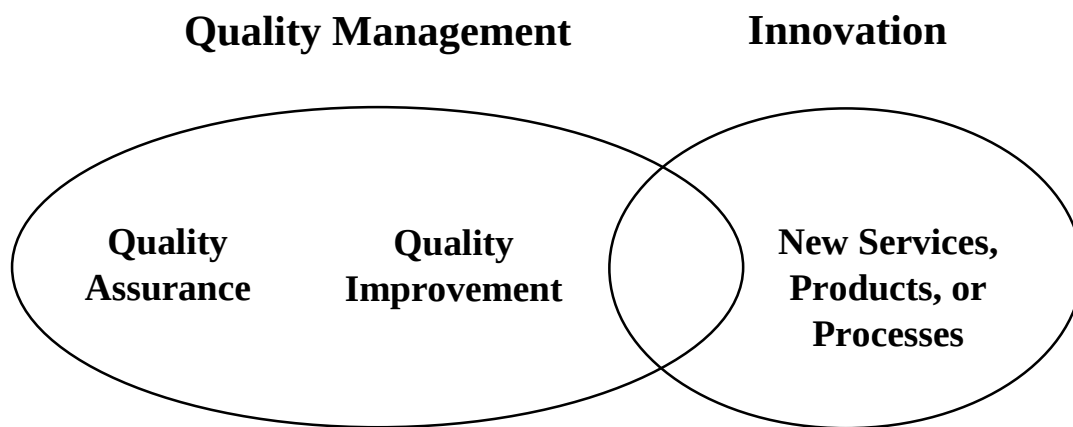
Hence, it is argued that TQM recognizes the quality problems existing in the organizational execution of quality improvement methods and processes in the public sector in order to generate ideas to address such problems through these service innovations. In view of this, these improvement ideas, created by managers or employees, are considered in the present study to be a potential type of service innovation that can span intra-organizational boundaries through the involvement of employees from various professional domains.

A common denominator can also be recognized by investigating the underlying objectives for innovation and quality management (Gambi *et al.*, 2020; Georgiev & Ohtaki, 2019). As illustrated in Figure 3.1, quality assurance and quality improvement are the key aspects of

quality management, whereas innovation denotes the creation of new services, processes, or products (Ng, 2009).

Figure 3.1

Relating Quality Management and Innovation



Source: Ng (2009).

Accordingly, both quality management and service innovation can be understood as strategies aiming to deliver superior customer value. Innovation concerns the creation of new values, whereas quality management concerns the constant delivery of these values. As previously stated, quality assurance and quality improvement are the key aspects of quality management, whereas innovation denotes the creation of new services, processes, or products (Ng, 2009). However, very few empirical studies have investigated the association between TQM and service innovation. For example, Khan and Naeem (2018) found that quality practices can improve service innovation. Again, however, very few studies have examined their links to aspects of service innovation. Accordingly, the following hypothesis is proposed:

H2: TQM positively affects service innovation within Abu Dhabi's public sector organizations.

3.3.3 Service Innovation and Sustainability Performance

Various studies have focused primarily on service itself, investigating issues relating to new service development processes, such as customer participation and the importance of idea generation, screening, development, and initiation (Chen *et al.*, 2011). Usually, contemporary service firms, such as public sector organizations, have to implement relevant service innovation strategies and practices to develop scalar business models, monitor staff performance, manage customer experience, and provide managerial process innovation (Tsai & Wang, 2017), which ultimately improves sustainability performance (Toivonen, 2016).

Service innovation can change a firm's internal business processes, for example by enhancing service-delivery capacity (Aas & Pedersen, 2010), thereby also enhancing economic (operational performance) and social sustainability (e.g. customer satisfaction resulting from swift service delivery). Service innovation has the ability to improve the financial performance of an organization (e.g. improved operating results, reduced operational costs, improved productivity, and increased profitability), reflecting the economic dimension of sustainability (Aas & Pedersen, 2010). It can also change innovative organizational internal capabilities. Moreover, the relationship between other stakeholders can be changed to positively affect customer value and employee relations (Lyons *et al.*, 2007) (e.g. customer satisfaction, customer focus, employee performance, and incentive mechanism), thereby improving social sustainability performance. Service innovation, on the other hand, can have external impacts, such as environmental effects (e.g. environmental thinking, environmental services) that improve environmental performance (environmental sustainability) (Horng *et al.*, 2016; Løvlie *et al.*, 2008). However, studies specifically focusing on service innovation and sustainability performance are still scarce (Calabrese *et al.*, 2018). Based on the above discussion, the following hypothesis is developed:

1 H3: Service innovation in Abu Dhabi's public sector positively drives its sustainability
2 performance.

3 **3.3.4 Total Quality Management (TQM), Service Innovation, and** 4 **Sustainability Performance**

5 In this study, it is argued that TQM applications in public sector organizations play a critical
6 role in service innovativeness, and thus also sustainability performance, through the promotion
7 of new service concepts, new service delivery systems, new client interfaces, and new
8 technological options, which are considered the foremost types of service innovation within
9 the public sector (Hertog, 2000).

10 According to the TQM and innovation literature, there is a need to investigate the methods to
11 deliver enhancements in organizational efficiency in the public sector that synthesize quality
12 improvement and a path for innovation generation (Mättö, 2019). One potential approach could
13 hence be a TQM method accompanied by service innovation creation.

14 According to Akgün *et al.* (2014), the application of TQM is related to increased business
15 innovativeness and, ultimately, better financial performance (the economic dimension of
16 sustainability). Androwis *et al.* (2018) stated that TQM practices represent the best way to
17 improve organizational performance via competitive advantage dimensions, such as
18 innovation. A significant positive relationship between TQM and organizational innovation
19 outcomes was also found by Abu-Salim *et al.* (2019), based on a survey of Abu Dhabi's
20 manufacturing and service industry, although it was limited to the private sector and ignored
21 the service innovation concept. Some authors have also stressed that the lack of service
22 innovation can also lead to TQM failure, thereby decreasing organizational performance
23 (Mättö, 2019) and sustainability performance.

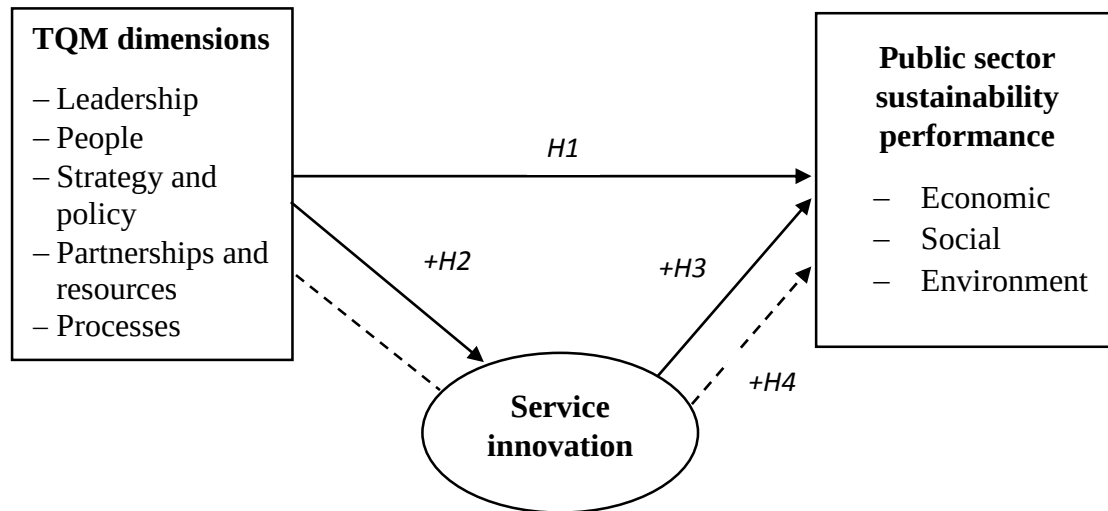
Furthermore, TQM practices and applications help public sector organizations to understand the needs of their stakeholders (e.g. residents and government and non-governmental institutions), develop new market/network relationships, and benchmark customer and business solutions against customer- or stakeholder-related problems (Akgün *et al.*, 2014). These activities underpin the public sector's efforts to transform its organizational practices, substitute existing strategies with innovative strategies, and attain improved forms of sustainability in public sector organizations, thereby improving sustainability performance. Accordingly, this study seeks to examine the effectiveness of TQM in Abu Dhabi's public sector as a potential source of service innovations, particularly in relation to enhancing its sustainability performance and to easing problems in its organizational processes. This study supports the notion that service innovations created via a quality improvement method (TQM tools) can be more easily adapted to process improvement and sustainability, specifically in the public sector. In view of this, the following hypothesis is developed:

H4: Service innovation in Abu Dhabi's public sector positively mediates the relationship between its TQM applications and sustainability performance.

The proposed research framework, encompassing TQM, service innovation, and public sector sustainability performance, is presented in Figure 3.2.

Figure 3.2

The Proposed Research Framework, Encompassing TQM, Service Innovation, and Public Sector Sustainability Performance



3.4 Chapter Summary

This chapter has reviewed the literature with regard to TQM, service innovation, and sustainability performance. Following the review of literature, four hypotheses reflecting the possible relationships between the constructs of the study (TQM, service innovation, and sustainability performance) were developed using RBV and stakeholder theories, as supported by the most relevant previous studies. In the next chapter, the methodology adopted in this research is elaborated.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

The purpose of this chapter is to elucidate and justify the methodological approaches employed in this study. Research methodology is referred to as the approach employed to gather and analyse data through specific, deliberately selected research methods. Thus, this chapter discusses and rationalizes the philosophical view of the study, followed by the research approach and the research strategy selected for this research. Thereafter, an explanation of the research design employed in this research, i.e., sample selection, data collection, and method of analysis, is provided. The chapter also details the research instrument and measurement adopted in relation to the key constructs of the study (TQM, sustainability performance, and service innovation). The chapter concludes with a summary.

4.2 Research Philosophy

Understanding a research philosophy helps researchers to understand which is the most appropriate research method to achieve the research objectives. As explained by Saunders *et al.* (2016), a research philosophy includes assumptions as to the way the researcher perceives the world. It denotes how a researcher can view the world (ontology), the researcher's association with the subject of the study and what the research objectives could be (epistemology), and the method a researcher espouses to gather and analyze data (methodology) (Collis & Hussey, 2017). Positivism, interpretivism, and realism are three widely used research philosophies applied in the discipline of business management (Saunders *et al.*, 2016). Each of these philosophical views are reviewed in Table 4.1.

1 **Table 4.41**

2 *Comparing Positivism, Interpretivism, and Realism Research Philosophies*

Philosophical Dimension	Positivism	Interpretivism	Realism
Nature of knowledge	– Knowledge is fundamentally grounded on verified hypotheses.	– Knowledge is based on subjective views, perceptions, values, and reasons.	– Knowledge is developed through social relations and live experience.
Nature of reality	– True reality is present in the world, following unchangeable natural cause–effect laws. – Objective reality – Reality is generalized. – Researchers and reality are independent.	– Reality is built, interpreted, and practiced by people via their social interactions within a broader social system. – Reality is subjective.	– Single apprehensible reality. – Reality is created as a result of political, economic, social, cultural, as well as ethnic values.
The researcher's role	– Exposes reality. – Scientifically elucidates, elaborates, and predicts a phenomenon.	– Studies social, cultural, as well as mental phenomena to discover why people behave in certain ways. – Elucidates the multiple realities.	– Political liberation and growing critical consciousness.
Theory building or theory testing	– Theories are postulated to test whether they are	– Theories are built from more than one reality (inductive approach).	– Theories are built through analyzing power relationships

	confirmed or rejected. – Deductive approach. – Theory testing occurs in a controlled setting by falsifying or supporting hypotheses via experimentation.	– Social and cultural contexts form theories. – Inductive approach.	(deconstructing the world). – Inductive approach.
Approach	– Quantitative research approach.	– Qualitative research approach.	– Quantitative and qualitative research approach.

Source: Bryman and Bell (2015), Collis and Hussey (2017), and Saunders *et al.* (2016).

In this study, positivism was considered the most suitable and effective research paradigm since it can be used as a quantitative research approach (Bryman & Bell, 2015) to investigate the relationships between the variables of the study (TQM elements, service innovation, and sustainability performance). It was selected based on the premise that this research only has validity and reliability if the available range of knowledge on the topic being studied (TQM, sustainability performance, service innovation) can be attained via measurable and objective observations. It is thus based upon examined facts, hard data, and objective views (Saunders *et al.*, 2016).

As assumed experiences, opinions, and views are not an acceptable way of attaining universal knowledge because these are all people's feelings, conferred subjectively (Collis & Hussey, 2017). Thus, people's highly subjective views regarding TQM's factors, service innovation, and sustainability performance in the public service sector do not effectively enable statistically testing the current study's research framework and hypotheses developed in Chapter 2, thus

leading to the rejection of the interpretivism and realism research philosophies. However, by using a relatively large sample size, the casual relationships between these variables can statistically be inferred, objectively, by adopting the positivism philosophy. To apply the positivism philosophy in this study, the following methods were used: deductive reasoning; and the choice of quantitative methodologies, including the collection of quantitative data and statistical analysis. The literature shows that any research study undertaken based on the positivist research philosophy must be supported by the facts and confirmed through statistical analysis; thereby, the end result is recognizable as specific knowledge reflecting fact-based data (Bryman & Bell, 2015; Collis & Hussey, 2017).

4.3 Research Approach

Two research approaches (the deductive and inductive approaches) are widely accepted in the research field relating to business management (Bryman & Bell, 2015; Collis & Hussey, 2017; Saunders *et al.*, 2016). An inductive approach begins with observations intending to produce a theory to be tested. It does not employ scientific methods, unlike the deductive approach. Instead, it focuses on the understanding of comprehensive observations to capture emerging themes (Bryman & Bell, 2015).

In contrast, in the deductive approach, existing theories are used to build the hypotheses that are then tested (Table 4.2). In this approach, more generic theory is first used to initiate the research before it is narrowed down to specifics (Collis & Hussey, 2017). In this study, a deductive approach was thus adopted as it entails developing hypotheses based on previous theories that are then tested. The aim of this study to investigate the impact of TQM practices on the sustainability performance of [Abu Dhabi's public sector](#) public sector via service innovation. This approach is most frequently applied in natural sciences and enables the use of scientific methods (Saunders *et al.*, 2016).

Table 4.52

Comparing Deductive and Inductive Approaches

Deductive Approach	Inductive Approach
– Positivist – Deductive – Quantitative – Questions such as “when,” “what,” and “how many” – Establishes causality – Follows a pre-determined design – Confirms theory (hypothesis testing)	– Interpretative – Inductive – Qualitative – Questions such as “how,” “why,” and “how many” – Explains causality – Follows a flexible research design that can be continually adapted – Develops theory

Source: Gratton and Jones (2010).

In summary, this research adopts a positivism philosophy with a quantitative approach to objectively gather data via instruments and test hypotheses developed based on prior theories, i.e. RBV and stakeholder theory. Hence, this study intends to use the standard version of the scientific method, known as the hypothetico-deductive method, which provides a systematic approach to answering research questions (Sekaran & Bougie, 2016).

4.4 Research Strategy

The research strategy confirms the availability of authentic data for the analysis to shed light on the studied phenomenon. These strategies vary from survey, experiment, and case study to grounded theory and ethnography (Saunders *et al.*, 2016). Concerning the research design, descriptive research was deemed as the most suitable research design for this study in order to explain the research framework and hypotheses developed in Chapter 2. This is because descriptive research is largely concerned with the relationships among two or more variables

and, thus, a descriptive study can be guided by one or more hypotheses (Sekaran & Bougies, 2016).

The descriptive nature of this study emphasizes the quantification of the data collection, instrument measurement, and analysis of the data (Bryman & Bell, 2015). Accordingly, in this study, a quantitative research strategy, based on survey strategy, was chosen over qualitative strategies. The survey strategy is associated with deductive approaches (Saunders *et al.*, 2016) and has the ability to gather data from a relatively large population within a short timeframe. Data collected using a survey strategy can be analyzed quantitatively using descriptive and inferential statistics (Bryman & Bell, 2015). Moreover, in quantitative surveys, the level of the researcher's subjectivity in methodology is lessened, while also often allowing the simplification and restructuring of more complex problems into a limited number of variables (Saunders *et al.*, 2016).

The validity of using a quantitative survey strategy is further demonstrated by several previous studies in the field of TQM and firm performance that have used a survey strategy to collect data via questionnaires and analyze them statistically (Abbas, 2020; Androwis *et al.*, 2018; Berman, 2015; Fatima & Mahaboob, 2018; Hollingworth & Valentine, 2014; Kang *et al.*, 2015; Lu *et al.*, 2011; Muhamad *et al.*, 2014; Ooi, 2014; Shafiq *et al.*, 2019; Tasleem *et al.*, 2019).

4.5 Time Horizon

There are two categories of descriptive studies concerning the time horizon for a survey: longitudinal (data are collected systematically over time); and cross-sectional (data are collected at one time). This study uses a cross-sectional research design as the preferred method as it is closely linked with questionnaires. A cross-sectional research design is regarded as the production of data "on more than one case and at a single point in time so as to collect a body

of quantitative or quantifiable data in connection with two or more variables, which are then examined to detect patterns of association” (Bryman & Bell, 2015, p. 53). Thus, the questionnaire used in the present study captured a case at a single point in time (April–May 2020) so that a quantitative data pool could be generated through which the investigation of the relationships between the variables (TQM, service innovation, and sustainability performance) in Abu Dhabi’s public service sector could be conducted.

4.6 Population, Sampling, and Data Collection

The sample frame encompasses information regarding the research population. The population of the study is Abu Dhabi’s service-based public organizations. Since there are many government service organizations across the seven emirates of the UAE, representative sampling was used to select Abu Dhabi’s public service organizations. Concerning public service organizations, there are 17 ministries and 32 independent government authorities in the UAE (Sarker & Al Athmay, 2017), which represent the population of the study. Since the UAE consists of seven emirates, such as Abu Dhabi, Dubai, Sharjah, Umm Al Quwain, Ras Al Khaimah, Ajman, and Fujairah whose economic structures, population, and economic activities can be different from each other, the current study was limited to the Emirate of Abu Dhabi, which is the largest emirate in the country in terms of the national landmass territory and economic activity (UAE Government, 2020).

Hence, a representative sample that consists of eight service-based public sector organizations located in Abu Dhabi was chosen to reflect the characteristics of the study’s population, which comprises all Abu Dhabi’s public service organizations. These eight chosen public sector organizations operate in fields such as health, ports and transport, municipality, education, digital government, economic development, police, and land and real estate. The study assumes that the population sample of the study is represented by Abu Dhabi’s public service

1 organizations that closely follow the ADAEP model in order to develop and encourage their
2 respective quality performance. The chosen representative sample was, thus, chosen from
3 among winners of the ADAEP awards (Khaleej Times, 2018). Another key reason to choose
4 the above-mentioned eight public organizations in this study is the fact that they are considered
5 the major public service providers in the emirate of the Abu Dhabi, UAE, offering services
6 required both for residents and companies to fulfil their needs, ranging from municipality-
7 related services to transportation and economic development services.

8 To select the respondents from the above-mentioned population sample, a random sampling
9 technique was employed in this study. Accordingly, the employees working the selected eight
10 service-based public sector organizations located in Abu Dhabi were randomly selected to
11 conduct an online survey. Using SurveyMonkey (a cloud-based software company providing
12 online survey-related services), an online questionnaire was delivered to the employees of the
13 eight chosen public sector organizations until more than 400 responses were gathered. As a
14 result, 433 responses were collected between April and May 2020. The key benefits of online
15 surveys are wider reach, speed and timeliness, flexibility, convenience, ease of data entry and
16 analysis, low administration costs, question diversity, control of the answering order,
17 controlled sampling, and the ability to engage with a large sample (Evans & Mathur, 2018).
18 Moreover, employees in Abu Dhabi's public service sector tended to use remote working
19 practices by staying at home due to the pandemic of COVID-19 during April to May 2020
20 (CNBC, 2020). An online survey was further deemed to be effective since it allowed the
21 employees to be autonomous, while being freely available online during this period.

22 The minimum sample size of the study was calculated by using population size [959,920 public
23 sector employees in the UAE (Annual Economic Report, 2019)], confidence level of 95%, and
24 margin of error of 5%, which was yielded in 384 public sector employees as the minimum

sample size of the study. This indicates that the study's adapted sample size of 433 was sufficient. Moreover, the adapted sample size of 433 was also deemed adequate for SEM as a size of 150–400 is the recommended sample size for SEM (Hair *et al.*, 2013). The selection of the sample size of 433 also is in line with one common rule for sample sizes in SEM, which is a minimum of 200 cases (Kline, 2011). It is also suggested that the sample size should be determined based on the criterion that it should be 5–10 times greater than the number of items presented in the questionnaire (Gozum & Aksayan, 2002). The number of items in the questionnaire of this study is 48, thus sample size should be between 240 and 480. Accordingly, the sample size of 433 was regarded as effective for the current study^{[MK1][OAS2]}.

4.7 Research Instrument and Measurement

The questionnaire was the deemed most appropriate research instrument for the current study, as its target population, which encompasses employees working in service-based public organizations of the UAE, has been involved in TQM practices, service innovation, and CSR practices across their government departments (Mansour & Jakka, 2013; UAE Government 2019, 2020). Questionnaires are advantageous since they are simple, easily accessible, and cost-effective compared to face-to-face interviews, as well as being reliable (Bryman & Bell, 2015). The validity of applying a questionnaire as a means of data collection for the current study is further ensured by a number of recent previous TQM-related studies that have used this approach (Abbas, 2020; Androwis *et al.*, 2018; Al-Dhaafri *et al.*, 2016; Berman, 2015; Dahlgaard-Park *et al.*, 2018; Fatima & Mahaboob, 2018; Gomes *et al.*, 2019; Hollingworth & Valentine, 2014; Kang *et al.*, 2015; Lu *et al.*, 2011; Muhamad *et al.*, 2014; Ooi, 2014; Shafiq *et al.*, 2019; Tasleem *et al.*, 2019).

Concerning the questionnaire development, a five-point Likert scale, ranging from “1” (strongly disagree) to “5” (strongly agree), was used to measure all three constructs of the study

(TQM, service innovation, and sustainability performance) (see Table 4.3). Five constructs for TQM (leadership, people, processes, strategy and policy, partnerships and resources) were adapted from Abbas (2020), ADAEP (2007), Androwis *et al.* (2018), Berman (2015), Fatima and Mahaboob (2018), Ooi (2014), and Shafiq *et al.* (2019) (see Figure 4.1). Each of these constructs contained five items. Service innovation was measured using two constructs (product and process innovation, organizational innovation), adapted from Aas and Pedersen (2010). The three constructs for sustainability performance (environmental, social, economic sustainability performance) were adapted from Abbas (2020), Lu *et al.* (2011), Muhamad *et al.* (2014), Tasleem *et al.* (2019), Hollingworth and Valentine (2014), and Kang *et al.* (2015). The questionnaire is presented in Appendices A (English version) and B (Arabic version).

Accordingly, it is clear that the scales used by the study are well established in various research studies. While the online survey was still in process, the initial 30 responses received were tested by using Cronbach Alpha, whose value was more than 0.7 (Hair *et al.*, 2018). Therefore, the researcher concluded not to pre-test the instrument.

Table 4.63

Measurement of the Constructs and Their Items

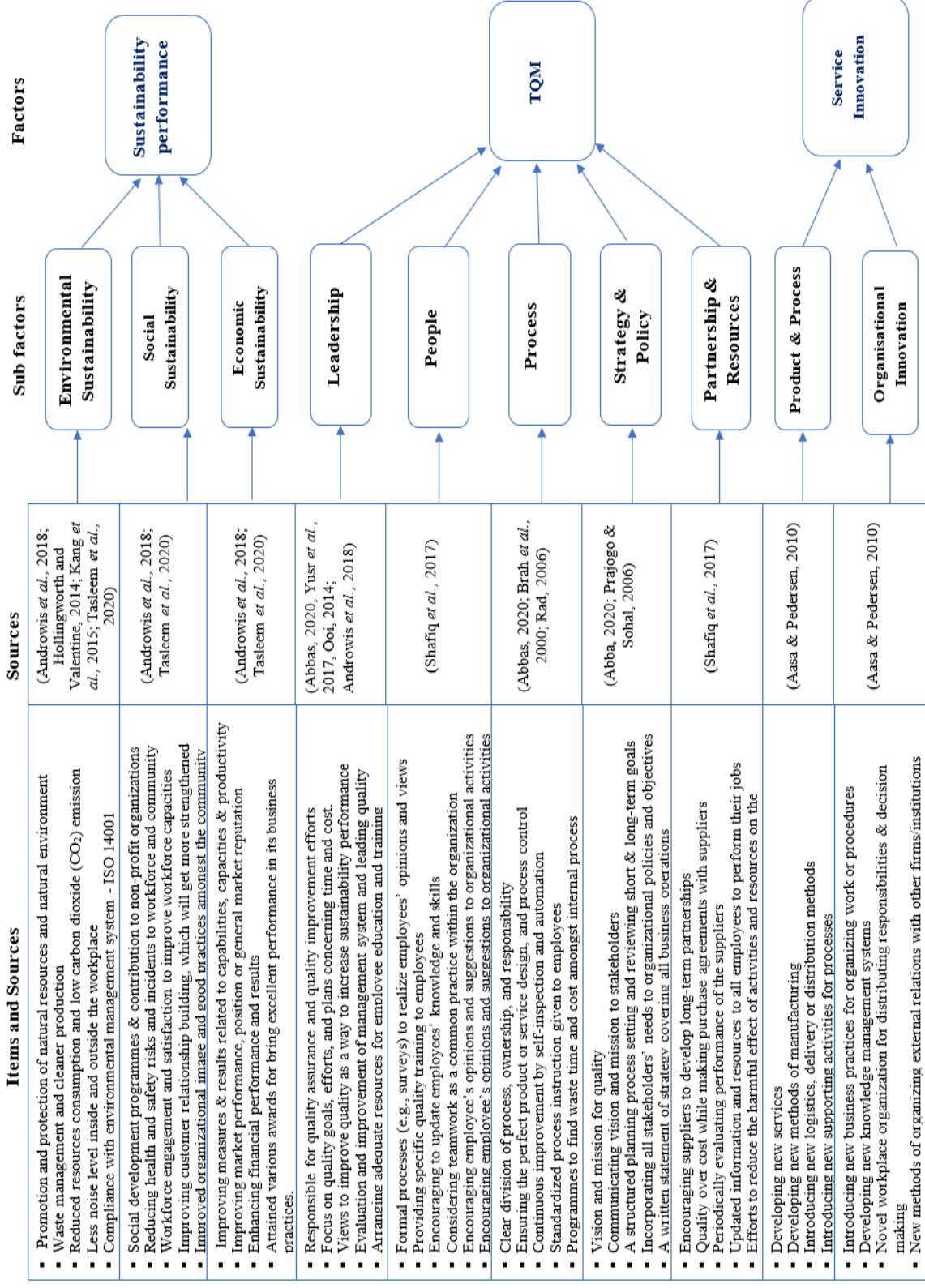
Second-Order Construct	First-Order Construct	Item Description	Source
<i>Sustainability performance</i>	Environmental sustainability	▪ Promotion and protection of natural resources and natural environment ▪ Waste management and cleaner production ▪ Reduced resources consumption and low carbon dioxide (CO₂) emission ▪ Lower noise level inside and outside the workplace ▪ Compliance with environmental management system: ISO 14001	(Andrewis <i>et al.</i> , 2018; Hollingworth & Valentine, 2014; Kang <i>et al.</i> , 2015; Tasleem <i>et al.</i> , 2019)
	Social sustainability	▪ Social development programs and contribution to non-profit organizations ▪ Reducing health and safety risks and incidents to workforce and community ▪ Workforce engagement and satisfaction to improve workforce capacities ▪ Improving customer relationship building to strengthen relationships ▪ Improved organizational image and good practices in the community	(Andrewis <i>et al.</i> , 2018; Tasleem <i>et al.</i> , 2019)
	Economic sustainability	▪ Improving measures and results related to capabilities, capacities, and productivity ▪ Improving market performance, position, or general market reputation ▪ Enhancing financial performance and results ▪ Attaining various awards for excellent performance in business practices	(Andrewis <i>et al.</i> , 2018; Tasleem <i>et al.</i> , 2019)
<i>Total quality management (TQM)</i>	Leadership	▪ Responsible for quality assurance and quality improvement efforts ▪ Focus on quality goals, efforts, and plans concerning time and costs ▪ Efforts to improve quality as a way to increase sustainability performance	(Abbas, 2020, Yusr <i>et al.</i> , 2017, Ooi, 2014; Andrewis <i>et al.</i> , 2018)

Second-Order Construct	First-Order Construct	Item Description	Source
		▪ Evaluation and improvement of management systems to improve quality ▪ Arranging adequate resources for employee education and training	
	People	▪ Formal processes (e.g. surveys) to capture employees' opinions and views ▪ Providing specific quality training to employees ▪ Encouraging employees to update their knowledge and skills ▪ Considering teamwork as a common practice within the organization ▪ Encouraging employees' sharing of opinions and suggestions regarding organizational activities	(Shafiq <i>et al.</i> , 2019)
	Process	▪ Clear division of process, ownership, and responsibility ▪ Ensuring the perfect product or service design and process control ▪ Continuous improvement through self-inspection and automation ▪ Standardized process instruction given to employees ▪ Programs to find wasted time and unnecessary costs among internal processes	(Abbas, 2020; Brah <i>et al.</i> , 2000; Rad, 2006)
	Strategy and policy	▪ Vision and mission for quality ▪ Communicating vision and mission to stakeholders ▪ A structured planning process setting and reviewing short- and long-term goals ▪ Incorporating all stakeholders' needs in organizational policies and objectives ▪ A written statement of strategy covering all business operations	(Abbas, 2020; Prajogo & Sohal, 2006)
	Partnerships and resources	▪ Encouraging suppliers to develop long-term partnerships ▪ Quality over cost while making purchase agreements with suppliers ▪ Periodically evaluating the performance of the suppliers ▪ Updated information and resources provided to all employees to help them perform their jobs ▪ Efforts to reduce the harmful effect of activities and resources on the environment	(Shafiq <i>et al.</i> , 2019)

Second-Order Construct	First-Order Construct	Item Description	Source
Service innovation	Product and processes	▪ Developing new services ▪ Developing new methods of manufacturing ▪ Introducing new logistics, delivery, or distribution methods ▪ Introducing new supporting activities for processes	(Aas and Pedersen, 2010)
	Organizational innovation	▪ Introducing new business practices for organizing work or procedures ▪ Developing new knowledge management systems ▪ Novel workplace organization for distributing responsibilities and decision-making ▪ New methods of organizing external relations with other firms/institutions	(Aas and Pedersen, 2010)

Figure 4.41

Data Structuration Process



4.8 Data Analysis

Various statistical methods were used for data analysis. First, EFA was performed to produce the factor structure relating to the collected data reflecting the items of TQM (service innovation, and sustainability performance). Second, CFA was performed to test whether the measurement models agreed with both the theoretical and empirical data. Finally, SEM was used to analyze the structural relationships between the constructs (Hair *et al.*, 2013) (TQM, service innovation, sustainability performance, and their subconstructs). SEM is a multivariate statistical analysis technique that encompasses correlation, factor analysis, ANOVA multivariate regression analysis, and model fit statistics, which are useful to statically assess the structural relationships between observed and unobserved (latent) study variables (Kline, 2015). For EFA, IBM SPSS v. 23.0, was used, while for the CFA and SEM testing, IBM AMOS v.23.0 was employed.

4.9 Chapter Summary

This chapter has elaborated the philosophical stance of the study, i.e. a positivism paradigm. Collecting the objective views and the use of statistical inference to develop and test the study's framework and hypotheses were the key motives for adopting a positivism philosophy, which led to using a deductive research approach. Given the descriptive nature of the study, showing the need to examine the casual relationship between TQM, service innovation, and sustainability performance in [Abu Dhabi's](#) public service organizations, a quantitative survey strategy was employed to collect data from 433 employees working in eight UAE public service organizations. The sample size of 433 was deemed sufficient (Hair *et al.*, 2013; Kline, 2011; Gozum & Aksayan, 2002).

CHAPTER 5: DATA ANALYSIS AND RESULTS

5.1 Introduction

This chapter provides the results derived through analyzing the data, which were used to test the hypotheses provided in Chapter 2. It begins with an analysis of the survey respondents' demographic characteristics, data screening, and preliminary data analyses, including missing value analysis, multivariate outliers, multivariate normality, and common method bias. EFA was then conducted, followed by CFA to ensure the reliability and validity of the measurement models. Finally, the hypotheses relating to the structural model of TQM, service innovation, and sustainability performance were tested and reported.

5.2 Analysis of the General Profile of Respondents

This section analyses the general profile of the respondents, who were randomly chosen for the online survey. The respondents were employees working in eight service-based public sector organizations in Abu Dhabi, encompassing digital government, economic departments, municipality, tourism, finance, police, transport, and land and real estate. Table 5.1 presents a summary of the demographic characteristics of the respondents who participated in the survey ($n=433$). Four demographic characteristics were examined: gender; profession/occupation; the highest level of education attained; and the number of years of experience.

The frequency analysis for the gender profiles of the respondents showed that 51% of the respondents were male and 49% were female. Concerning the profession, the majority of the respondents were managers/directors, followed by officers/engineers (22%), team leaders/heads of section (21%), and presidents/chief executive officers (CEOs) (11%). The vast

majority of the respondents had either a bachelor's degree (46%) or a postgraduate degree (MA/MSc/PhD) (45%).

Regarding the number of years' experience in the public service organization, the survey participants had an experience of 11–15 years (25%), above 20 years (25%), 6–10 years (20%), and 16–20 years (19%). These demographic characteristics indicate that the study sample ($n=433$) represents a pool of experienced and educated employees at a high professional level in the organization. This implies that the responses to the survey questions can be considered reliable inputs for a valid statistical analysis.

Table 5.71

Demographic Characteristics of Respondents

Demographic Characteristics	Frequency ($n=433$)	Percentage
<i>Gender</i>		
Male	212	51
Female	221	49
<i>Profession/occupation</i>		
President / CEO	47	11
Senior Vice President	6	1
Vice President	14	3
Manager/Director	141	33
Supervisor/Senior Engineer	37	9
Team Leader/Head of Section	92	21
Officer / Engineer	96	22
<i>Highest level of education attained</i>		
High school	15	3
College diploma	25	6
Bachelor's degree	200	46
Postgraduate degree (MA/MSc/PhD)	193	45
<i>Number of years of experience</i>		
0–5	47	11
6–10	86	20
11–15	109	25
16–20	83	19
>20	108	25

5.3 Data Screening and Preliminary Analyses

The purpose of this section is to ensure the reliability of the set of data used for further analysis, as well as hypothesis testing. Hence, data screening and preliminary analyses for missing data, multivariate outliers, normality, and common method bias were first conducted to enhance the reliability of the collected data.

5.3.1 Missing Value Analysis

In SEM analysis, missing values create problems in computing fit measures or modification indices in IBM AMOS (Arbuckle, 2005). However, the online survey espoused by the current study did not present any missing values as it was designed in a way that the respondents could not skip any questions when completing the main survey.

5.3.2 Unengaged Responses

Moreover, no unengaged responses were observed in the survey, implying that respondents engaged effectively with the survey. This was verified through the non-zero standard deviation of the Likert-scale scores provided by each respondent. Analysis of the demographic characteristics of the respondents (Table 5.1) also demonstrates that they were educated and experienced enough to answer the questionnaire.

5.3.3 Multivariate Outliers

Multivariate outliers are referred to as observations that seem to be inconsistent with the remainder of the data, describing abnormal data behavior (Lovric, 2014). Multivariate outliers may grossly distort the statistical analysis, while their impact may not be noticeable at other times (Hair *et al.*, 2010). Hence, the Mahalanobis (D2) test was conducted to detect multivariate outliers in the collected set of data (Lovric, 2014). Subsequently, 42 observations

were revealed as multivariate outliers because the probability value of their Mahalanobis (D2) measures was less than 0.001 (Tabachnick & Fidell, 2007) (Appendix C). Hence, such outliers were removed from the set of data to enhance their reliability.

5.3.4 Multivariate Normality

Multivariate normality, a fundamental assumption of multivariate analysis, presumes that a set of data has normal distribution (Hair *et al.*, 2010). Covariance-based SEM analysis produced by AMOS basically relies on the normality of data (Arbuckle, 2005). Byrne (2010) argued that if the skewness value is between -2 and $+2$, and the kurtosis value is between -7 and $+7$, the multivariate normality of data can be assumed. In this study, the skewness value for each variable was between -1.782 and -0.718 , while kurtosis value was between $+0.659$ and $+4.354$ (Appendix D), revealing that the set of data is in line with the multivariate normality assumption.

5.3.5 Common Method Bias

Common method bias is referred to as the spurious variance attributable to the measurement method of the questionnaire rather than to the constructs that the measures implicitly represent (Chang *et al.*, 2010). Common method bias may indicate false internal consistency among the constructs. In this study, Harman's one-factor method was espoused to test whether the measurement of the instrument was biased or not. If one factor characterizes the majority of the variance, it is assumed that common bias method exists (Chang *et al.*, 2010). In this study, Harman's one-factor test showed that one-factor solution reported less than 50% (38.79%) of total variation (Appendix E, Table E1), indicating the non-appearance of common method bias.

5.4 Exploratory Factor Analysis (EFA)

EFA was initially performed to produce the factor structure relating to the collected data reflecting the items of TQM, service innovation, and sustainability performance and their subconstructs. With 48 questionnaire items, a 10-factor solution was generated by using principal component analysis. According to Nunnally and Bernstein (1994), if an item's factor loading is less than 0.40 and the absolute difference among its cross-loadings is below 20%, it is a poor and unclear loading. In view of that, four items (SCL1, SCL5, ECN5, and PDR1) were removed from the study as their loadings are either lower than 0.40 or cross-loaded. Thus, two items were removed from the social sustainability construct, one from economic sustainability construct, and one from partnerships and resources construct, a constituent of the TQM construct (Table 5.2).

Table 5.2

Items Removed from the EFA Analysis

Construct	Items	Factor loading
Social sustainability	SCL1: Social development programs and contribution to non-profit organizations	0.290
	SCL5: Improved organizational image reflecting good practices amongst the community	0.345
Economic sustainability	ECN2: Improving market performance, position or general market reputation	0.288
Partnerships and resources	PDR1: Encouraging suppliers to develop long-term partnerships with the organization	0.352

The EFA was conducted after eliminating the above-mentioned four items. Using the remaining 44 items, a 10-factor solution with a total variance of 66.95% was generated

(Appendix E, Table E2). The Kaiser–Meyer–Olkin (KMO) value, a measure of sample adequacy, was 0.954, and Bartlett’s test of sphericity was (χ^2) =13,266.50 (df=1.128, p =0.000) (Table 5.3), which indicates that the correlation matrix of the data used for the EFA has an identity matrix (Child, 2006). These two tests imply the suitability of the data for factor analysis. Communalities of each item/variable were between 0.496 and 0.769, indicating a significant variance explained by the factors (Appendix E, Table E3).

Table 5.93

KMO and Bartlett’s Tests

KMO measure of sampling adequacy		0.954
Bartlett’s test of sphericity	Approx. chi-square	13,266.502
	df	1.128
	Sig.	0.000

Table 5.4 shows the results of the EFA together with the factor loadings of the items associated with 10 factors: environmental sustainability (ENV); social sustainability (SCL); economic sustainability (ECN); leadership (LED); people (PPL); processes (PRS); strategy and policy (SGP); partnerships and resources (PDR); product and process innovation (PPR); and organizational innovation (INN). This factor analysis used five items for environmental sustainability (ENV1, ENV2, ENV3, ENV4, ENV5), three items social sustainability (SCL2, SCL3, SCL4), four items for economic sustainability (ECN1, ECN3, ECN4, ECN5), five items for leadership (LED1, LED2, LED3, LED4, LED5), five items for people (PPL1, PPL2, PPL3, PPL4, PPL5), five items for processes (PRS1, PRS2, PRS3, PRS4, PRS5), five items for strategy and policy (SGP1, SGP2, SGP3, SGP4, SGP5), four items for partnerships and resources (PRS2, PRS3, PRS4, PRS5), four items for product and process innovation (PPR1,

- 1 PPR2, PPR3, PPR4), and four items for organizational innovation (INN1, INN2, INN3, INN4).
- 2 Appendix F presents the wordings of each coded item used for factor analysis.

Table 5.104

Factor Loadings and Cross-Loadings

Item	ENV	SCL	ECN	LED	PPL	PRS	SGP	PDR	PPR	INN
ENV1	0.899	-0.056	-0.075	0.002	-0.091	0.002	0.046	-0.039	0.030	0.027
ENV2	0.923	-0.012	-0.096	-0.053	-0.069	0.128	0.010	-0.077	0.046	0.026
ENV3	0.876	-0.003	0.005	-0.035	-0.060	0.003	0.054	-0.022	0.039	-0.083
ENV4	0.444	-0.005	0.162	0.051	0.118	0.060	-0.088	0.272	-0.133	-0.049
ENV5	0.544	0.182	-0.055	-0.077	0.125	0.047	0.027	0.103	-0.164	0.179
SCL2	-0.007	0.592	0.188	0.190	-0.051	-0.126	-0.042	0.065	-0.097	0.234
SCL3	0.012	0.666	-0.066	-0.043	0.089	0.067	0.041	0.092	0.198	-0.154
SCL4	-0.035	0.579	-0.096	0.122	0.093	-0.087	0.075	-0.165	-0.183	0.494
ECN1	-0.070	-0.013	0.979	-0.124	-0.078	0.071	0.132	-0.019	0.040	-0.175
ECN3	0.077	-0.007	0.417	0.040	0.392	-0.153	-0.016	0.058	0.124	-0.075
ECN4	0.076	0.134	0.489	0.033	0.162	-0.052	-0.049	-0.102	0.088	0.034
ECN5	-0.117	0.020	0.978	-0.087	-0.119	0.204	0.095	-0.131	0.049	-0.093
LED1	0.173	-0.006	-0.072	0.814	0.005	0.059	0.046	-0.230	0.157	-0.097
LED2	-0.037	0.063	-0.092	0.879	0.046	0.019	0.061	-0.038	0.070	-0.124
LED3	-0.104	0.039	-0.044	0.819	-0.185	0.111	0.006	0.102	0.091	0.044
LED4	0.021	-0.032	0.102	0.838	-0.151	0.165	-0.041	0.103	-0.100	-0.035
LED5	-0.137	-0.002	-0.147	0.702	0.307	-0.053	0.021	0.144	0.061	-0.144
PPL1	0.060	0.257	0.035	-0.049	0.507	0.189	0.040	-0.250	-0.011	0.062

Item	ENV	SCL	ECN	LED	PPL	PRS	SGP	PDR	PPR	INN
PPL2	0.011	0.094	-0.046	-0.039	0.916	0.013	0.001	-0.028	0.049	-0.159
PPL3	-0.087	0.094	-0.145	-0.039	0.816	-0.002	0.089	0.235	-0.004	-0.085
PPL4	-0.145	-0.066	0.089	-0.102	0.681	0.320	-0.053	-0.105	-0.038	0.228
PPL5	-0.037	-0.160	-0.069	0.012	0.752	0.232	-0.016	0.007	-0.077	0.199
PRS1	-0.112	-0.072	0.242	0.115	0.243	0.549	-0.041	0.116	-0.132	0.009
PRS2	0.055	0.072	0.180	0.118	0.130	0.624	-0.008	-0.106	0.064	-0.084
PRS3	0.069	0.055	0.028	-0.003	0.023	0.587	0.015	0.034	0.177	0.034
PRS4	0.080	0.048	-0.142	0.066	0.160	0.514	0.122	0.080	-0.087	0.070
PRS5	0.103	-0.093	0.020	0.099	-0.024	0.635	-0.037	0.136	-0.026	0.103
SGP1	-0.050	0.031	0.175	0.162	-0.135	-0.013	0.757	-0.098	-0.152	0.199
SGP2	-0.088	-0.042	0.185	-0.035	-0.020	-0.054	0.813	0.101	-0.102	0.156
SGP3	0.084	-0.047	0.051	-0.071	0.099	-0.014	0.751	0.058	0.063	-0.010
SGP4	0.123	0.044	-0.083	0.031	0.040	0.060	0.728	0.039	0.081	-0.142
SGP5	0.039	0.064	-0.036	0.031	0.052	0.041	0.685	0.052	0.125	-0.060
PDR2	-0.065	0.477	0.186	-0.168	-0.139	0.142	-0.073	0.510	0.162	-0.137
PDR3	-0.008	-0.077	-0.046	0.059	0.055	0.045	0.063	0.714	0.101	-0.038
PDR4	-0.060	0.001	-0.078	-0.006	0.177	-0.039	0.093	0.663	0.093	0.096
PDR5	0.041	0.081	-0.103	0.030	-0.060	0.083	0.038	0.817	-0.139	0.093
PPR1	0.020	0.046	0.032	0.055	-0.022	-0.105	-0.009	0.034	0.737	0.128
PPR2	0.023	0.059	-0.005	0.043	0.069	-0.021	-0.063	-0.003	0.822	0.065

Item	ENV	SCL	ECN	LED	PPL	PRS	SGP	PDR	PPR	INN
PPR3	-0.033	-0.013	0.110	0.059	-0.015	0.047	-0.017	-0.081	0.810	0.084
PPR4	0.029	-0.033	0.071	0.053	-0.048	0.083	0.042	-0.024	0.718	0.141
INN1	-0.039	-0.069	-0.019	0.032	-0.032	0.033	0.073	0.075	0.389	0.502
INN2	-0.049	0.015	0.003	-0.023	-0.013	0.001	0.059	0.083	0.362	0.556
INN3	0.055	-0.002	-0.152	-0.191	0.017	0.096	0.020	0.007	0.127	0.852
INN4	-0.006	0.042	-0.087	-0.032	-0.018	-0.009	-0.015	0.093	0.359	0.672

Notes: Extraction method: principal component analysis. Rotation method: Promax with Kaiser normalization. Bold values are loadings for each item that is above the recommended value of 0.4; an item's loadings on its own variable are higher than all of its cross-loadings with other variables.

5.5 Confirmatory Factor Analysis (CFA)

During the SEM process, CFA was utilized to statistically test the proposed measurement models of the study. A measurement model is a combination of several indicators/items for a construct (Hair *et al.*, 2018). Hence, CFA was executed to verify the basic indicators/items of the 10 constructs that were produced by the EFA, and to validate the associations that existed amongst the measurement models of the study. The reliability, convergent validity, and discriminant validity, thus, were tested to confirm construct reliability and validity.

5.5.1 Reliability

Reliability refers to the internal consistency of the scales, which can be determined through Cronbach's alpha. A Cronbach's alpha value in the excess of 0.70 can be regarded as statistically reliable (Hair *et al.*, 2013). Table 5.5 shows that the Cronbach's alpha values of all 10 constructs were in excess of 0.70, indicating they are statistically reliable.

Table 5.11

Construct Reliability and Convergent Validity

First-Order Construct	Second-Order Construct	Item	Factor Loading	CR	AVE	Cronbach's Alpha
Environmental sustainability (ENV)	Sustainability performance (SP)	ENV1	0.899	0.844	0.521	0.841
		ENV2	0.923			
		ENV3	0.876			
		ENV4	0.444			
		ENV5	0.544			
Social sustainability (SCL)		SCL2	0.592	0.715	0.462	0.741
		SCL3	0.666			
		SCL4	0.579			
Economic sustainability (ECN)		ECN1	0.979	0.786	0.479	0.806
		ECN3	0.417			
		ECN4	0.489			
		ECN5	0.978			
Leadership (LED)	Total quality management (TQM)	LED1	0.814	0.882	0.599	0.880
		LED2	0.879			

First-Order Construct	Second-Order Construct	Item	Factor Loading	CR	AVE	Cronbach's Alpha
People (PPL)		LED3	0.819			
		LED4	0.838			
		LED5	0.702			
		PPL1	0.507	0.733	0.540	0.857
		PPL2	0.916			
Process (PRS)		PPL3	0.816			
		PPL4	0.681			
		PPL5	0.752			
		PRS1	0.549			
		PRS2	0.624	0.852	0.536	0.859
Strategy and policy (SGP)		PRS3	0.587			
		PRS4	0.514			
		PRS5	0.635			
		SGP1	0.757	0.896	0.634	0.896
		SGP2	0.813			
		SGP3	0.751			

First-Order Construct	Second-Order Construct	Item	Factor Loading	CR	AVE	Cronbach's Alpha
Partnerships and resources (PDR)		SGP4	0.728			
		SGP5	0.685			
		PDR2	0.510	0.732	0.538	0.905
		PDR3	0.714			
		PDR4	0.663			
Product and process innovation (PPR)	Service innovation (SI)	PDR5	0.817			
		PPR1	0.737	0.906	0.707	0.800
		PPR2	0.822			
		PPR3	0.810			
		PPR4	0.718			
Organizational innovation (INN)		INN1	0.502	0.856	0.600	0.850
		INN2	0.556			
		INN3	0.852			
		INN4	0.672			

Notes: CR=composite reliability; AVE=average variance extracted.

5.5.2 Convergent validity

Convergent validity is the degree to which multiple items adopted to measure the same construct are in agreement. Composite reliability (CR) and average variance extracted (AVE) were used to test the convergence validity (Hair *et al.*, 2010). A CR value in the excess of 0.70 can be considered as statistically significant whilst the AVE should exceed 0.50 to be statistically significant (Zaiř & Berteá, 2011). The results of the measurement model (Table 5.5) show that only two factors, SCL and ECN, had an AVE value below 0.50, violating the rule of thumb. However, this finding was accepted since Fornell and Larcker (1981) argued that if the value of AVE is lower than 0.50 but the CR value exceeds 0.6, then the convergent validity is acceptable. Hence, the findings show that the measures adopted by this study demonstrate convergent validity.

5.5.3 Discriminant validity

Discriminant validity was confirmed following the criterion of Fornell and Larcker (1981) that the square root of AVE should be more than the squared correlation amongst the dimensions. Discriminant validity is the extent to which items vary between distinct concepts (Hair *et al.*, 2013). The results show that the values for each construct support discriminant validity (Table 5.6), indicating that the square root of AVE for each construct is higher than the squared correlations involving the construct. The comparison of cross-loadings provided in Table 5.4 also indicates that each item's loadings are greater than other factor loadings for its own construct in the same row and same column, reflecting adequate discriminant validity.

Table 5.126

Discriminant Validity

	PDR	PPR	ENV	PPL	SGP	LED	ECN	PRS	INN	SCL
PDR	0.734									
PPR	0.711	0.841								
ENV	0.570	0.489	0.722							
PPL	0.704	0.591	0.604	0.735						
SGP	0.721	0.662	0.560	0.665	0.796					
LED	0.659	0.677	0.607	0.675	0.715	0.890				
ECN	0.609	0.630	0.715	0.707	0.579	0.683	0.789			
PRS	0.727	0.653	0.636	0.710	0.727	0.748	0.669	0.853		
INN	0.710	0.774	0.526	0.642	0.714	0.682	0.594	0.657	0.774	
SCL	0.600	0.499	0.563	0.569	0.643	0.649	0.630	0.582	0.646	0.69

Notes: ENV=environmental sustainability; SCL=social sustainability; ECN=economic sustainability; LED=leadership; PPL=people; PRS=processes; SGP=strategy and policy; PDR=partnerships and resources.

5.6 Structural Equation Modeling (SEM)

5.6.1 The First-Order and Second-Order Constructs

In this study, the TQM, service innovation, and sustainability performance constructs were conceptualized as second-order constructs. Byrne (2010) stated that the first-order constructs should adequately explain the hypothesized second-order constructs while being distinct. The analysis of squared multiple correlation (SMC), known also as R^2 , reveals that all the first-order constructs range from 0.60 to 0.78, indicating first-order constructs adequately explain their respective second-order construct (Table 5.7). Table 5.4 also shows that each construct is

different from other constructs. Hence, the analysis suggested that the first-order constructs adequately explain the second-order constructs (LED, PPL, PRS, SGP, and PDR for TQM; ENV, SCL, and ECN for sustainability performance; and INN and PPR for service innovation).

Table 5.137

Validity of Second- and First-Order Constructs

Second-order	First-order	R ²
Sustainability performance (SP)	Environmental sustainability (ENV)	0.609
	Social sustainability (SCL)	0.589
	Economic sustainability (ECN)	0.778
Total quality management (TQM)	Leadership (LED)	0.696
	People (PPL)	0.657
	Process (PRS)	0.601
	Strategy and policy (SGP)	0.716
	Partnerships and resources (PDR)	0.723
Service innovation (SI)	Product and process innovation (PPR)	0.637
	Organizational innovation (INN)	0.646

5.6.2 Structural Model and Hypotheses Testing

AMOS v.23 was used to test the structural models and hypotheses. To verify the model fit with empirical data, several criteria for goodness-of-fit indices were used, including the normed chi-squared test (χ^2/df), goodness-of-fit index (GFI), comparative fit index (CFI), root mean square

error of approximation (RMSEA), incremental fit index (IFI), and Tucker–Lewis index (TLI). The results show that the actual value of all fit indices of the structural model of the study exceed the acceptable value (Table 5.8).

Table 5.148

Model Fit Indices

Model Fit index	The threshold value	Actual value	Conclusion
Norm chi-squared test (X^2/df)	≤ 5 (Timothy, 2015)	2.405; $p=0.00$	Acceptable
Goodness-of-fit index (GFI)	Near to 1 is acceptable (Holmes-Smith <i>et al.</i> , 2006)	0.815	Acceptable
Comparative fit index (CFI)	≥ 0.70 (Timothy, 2015)	0.892	Acceptable
Root mean square error of approximation (RMSEA)	≤ 0.080 (Awang, 2012)	0.057	Acceptable
Tucker–Lewis index (TLI)	Near to 1 is acceptable (Holmes-Smith <i>et al.</i> , 2006)	0.885	Acceptable
Incremental fit index (IFI)	Near to 1 is acceptable (Holmes-Smith <i>et al.</i> , 2006)	0.892	Acceptable

Path analysis was conducted using the bootstrapping approach for 1,000 samples computed at 95% confidence (Hair *et al.*, 2013). Table 5.9 and Figure 5.1 show the results of the structural model analysis. In the TQM, service innovation, and sustainability performance model, the path coefficients connecting the various items/variables to the factors are referred to as the factor loading. They are also known as the standardized regression coefficients. Regression weights indicate the effect of an item on another variable (Hair *et al.*, 2018).

Table 5.159

The Results of Path Analysis

			Estimate	Standard Error	Critical Ratio	p-value
SI	←	TQM	1.08	0.04	17.08	<0.001
SP	←	TQM	0.566	0.04	17.08	<0.001
SP	←	SI	0.325	0.04	17.08	<0.001
PPR	←	TQM	0.798	0.08	12.86	<0.001
PPL	←	TQM	0.810	0.08	10.36	<0.001
SGP	←	TQM	0.846			NS
PDR	←	TQM	0.850	0.08	10.00	<0.001
LED	←	TQM	0.834	0.08	13.03	<0.001
ENV	←	SP	0.780	0.07	11.63	<0.001
SCL	←	SP	0.767	0.08	12.08	<0.001
PRS	←	SI	0.775			NS
INN	←	SI	0.804	0.12	15.00	<0.001
ECN	←	SP	0.882			NS

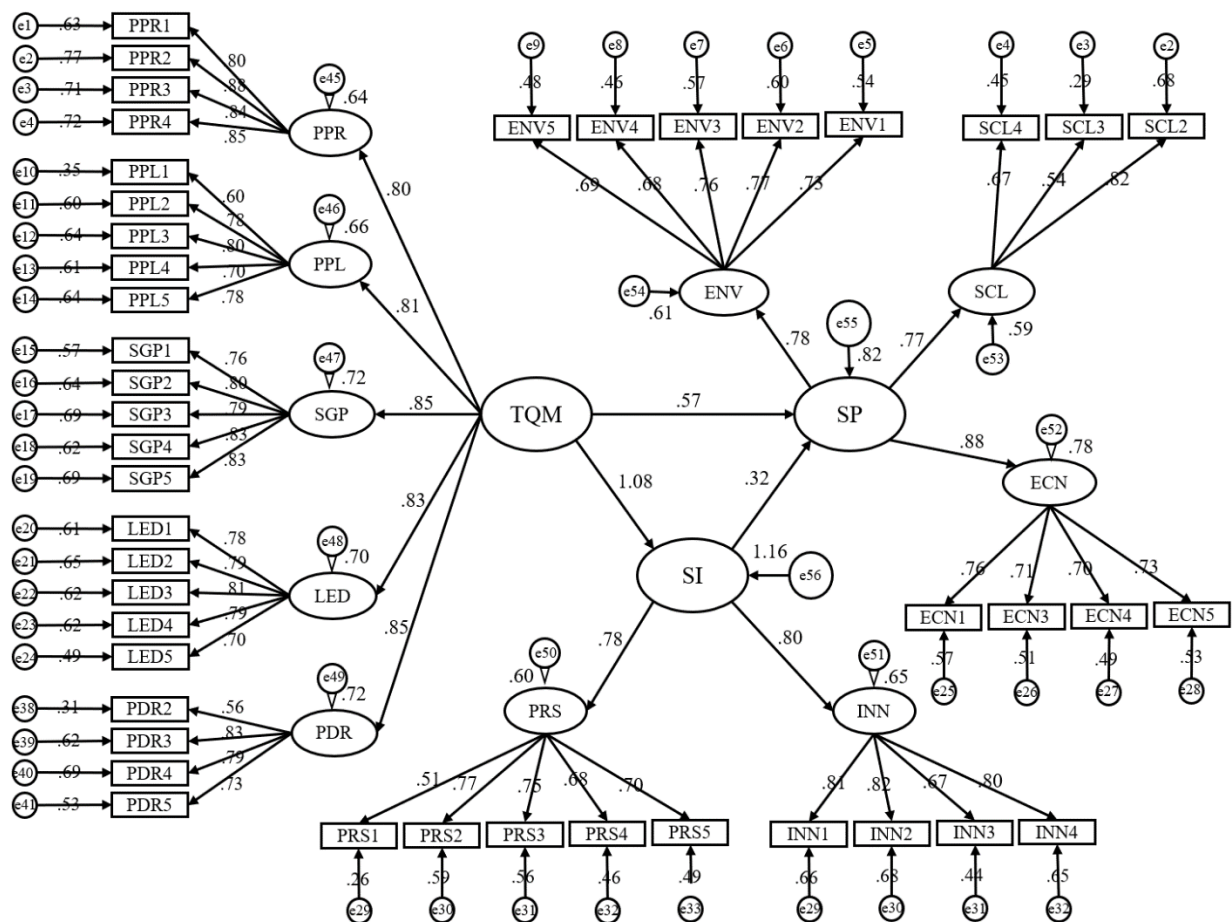
Notes: NS=not significant; SI=service innovation; TQM=total quality management; SP=sustainability performance; ENV=environmental sustainability; SCL=social sustainability; ECN=economic sustainability; LED=leadership; PPL=people; PRS=processes; SGP=strategy and policy; PDR=partnerships and resources.

Table 5.9 shows that the direct relationship between TQM and sustainability performance was statistically significant and positive ($\beta=0.566$; $p<0.05$), thus supporting *H1*. Moreover, concerning the elements of TQM, the model comprising TQM, service innovation, and sustainability performance suggested that leadership ($\beta=0.798$; $p<0.05$), people ($\beta=0.810$; $p<0.05$), processes ($\beta=0.850$; $p<0.05$), and partnerships and resources ($\beta=0.834$; $p<0.05$) were the most significant elements of the ADAEP quality management model, which is related to Abu Dhabi's public sector's sustainability performance, while strategy and policy ($\beta=0.846$;

$p>0.05$) was proposed to be insignificant. Hence, $H1a$, $H1b$, $H1d$, and $H1e$ were accepted, while $H1c$ was rejected. The results further revealed that TQM and service innovation are significantly positive ($\beta=1.08$; $p<0.05$), thus supporting $H2$. Additionally, it was found that service innovation significantly leads to sustainability performance in the public sector of the Abu Dhabi ($\beta=0.325$; $p<0.05$), hence supporting $H3$.

Figure 5.51

Structural Model of TQM, Service Innovation, and Sustainability Performance



Goodness of fit statistics

CMIN/DF=2.405
 p -value=0.00
 GFI=0.815
 CFI=0.892
 RMSEA=0.57
 TLI=0.885
 IFI=0.892

5.6.3 Mediation Analysis

Assessing the likely indirect relationships between latent variables is another vital assessment in SEM. Such indirect relationships can be examined by conducting a mediating analysis. Based on the current study's hypothetical framework, the mediating impact of service innovation has been proposed in the association between TQM and sustainability performance. To examine the mediating effect of service innovation on the relationship between TQM and sustainability performance, the direct and indirect effects were explored by using SEM with the bootstrapping method for 1,000 re-samples.

The results show that service innovation partially mediates ($\beta=0.350$; $p<0.05$) the association between TQM and sustainability performance (Table 5.10), thus supporting *H4*. If the direct effect between an independent and dependent variable is statistically significant, a statistically significant mediation is referred to as partial mediation (Hair *et al.*, 2018). In the present study, it was showed that the direct effect of TQM on sustainability performance is statistically significant and positive ($\beta=0.566$; $p<0.05$). Additionally, the indirect effect of service innovation on the relationship between TQM and sustainability performance was also revealed to be statistically significant ($\beta=0.350$; $p<0.05$), showing the partial mediation effect of service innovation. Hence, full effect of service innovation and TQM on sustainability performance is positive and statistically significant ($\beta=0.916$; $p<0.05$).

Table 5.1610

Mediating Effect of Service Innovation

	Direct Effect	Indirect Effect	Full Effect
Estimate	0.566	0.350	0.916
<i>p</i> -value	0.02	0.02	0.020

5.7 Chapter Summary

In this chapter, the results of the statistical analyses, including EFA, CFA, path analysis, and mediation analysis, have been presented. CFA showed that the measurements model (10 first-order constructs) used in the study was reliable and valid. Additionally, the second order constructs (TQM, service innovation, and sustainability performance) were revealed to be reliable and valid as they were explained by their respective first-order constructs, while being distinct from other constructs. The results further demonstrated the structural model's (TQM, service innovation, and sustainability performance) goodness of fit as the values for CFI, GFI, RMSEA, TLI, and IFI indices were within the acceptable range. Finally, hypothesis testing, including mediation analysis, was conducted using path analysis, including the direct and indirect effects. A summary of the hypotheses testing results is provided in Table 5.11.

Table 5.11

Summary of Hypothesis Testing

Hypothesis Statement	Conclusion
H1: TQM in Abu Dhabi's public sector has a significant and positive impact on its sustainability performance.	Supported
H1a: Leadership positively affects Abu Dhabi public sector's sustainability performance.	Supported
H1b: People positively affects Abu Dhabi public sector's sustainability performance.	Supported
H1c: Strategy and policy positively affects Abu Dhabi public sector's sustainability performance.	Rejected
H1d: Partnerships and resources positively affects Abu Dhabi public sector's sustainability performance.	Supported
H1e: Processes positively affects Abu Dhabi public sector's sustainability performance.	Supported

<i>H2: TQM positively affects service innovation within Abu Dhabi's public sector organizations.</i>	Supported
<i>H3: Service innovation in Abu Dhabi's public sector positively drives its sustainability performance.</i>	Supported
<i>H4: Service innovation in Abu Dhabi's public sector positively mediates the relationship between its TQM applications and sustainability performance.</i>	Supported

- 1 In the next chapter, the study's findings are further elaborated and discussed in relation to the
- 2 research questions, objectives, and hypotheses developed in Chapters 1 and 2.

CHAPTER 6: DISCUSSION

6.1 Introduction

Chapters 1 and 2 demonstrated the significance of this study and that developing and implementing an effective TQM model, such as the ADAEP model, could be used to establish a framework for service innovation and sustainability performance within Abu Dhabi's public service sector. Accordingly, the following four hypotheses were developed in Chapter 2 and tested in Chapter 4.

H1: TQM in Abu Dhabi's public sector has a significant and positive impact on its sustainability performance.

H2: TQM positively affect service innovation within Abu Dhabi's public sector organizations.

H3: Service innovation in Abu Dhabi's public sector positively drives its sustainability performance.

H4: Service innovation in Abu Dhabi's public sector positively mediates the relationship between its TQM applications and sustainability performance.

The purpose of this chapter is, thus, to discuss the results provided in Chapter 4 in relation to the research objectives, the existing literature, and previous studies. First, the results relating to TQM and sustainability performance in Abu Dhabi's public sector are discussed, followed by discussion of the effect of the ADAEP model's TQM elements on sustainability performance. Second, the findings in relation to the link between TQM and service innovation

are elaborated. Third, how service innovation leads to sustainability performance is elucidated by using the findings of the previous chapter and current literature. Finally, the mediation effect of service innovation on the link between TQM and sustainability performance is deliberated.

6.2 Total Quality Management (TQM) and Sustainability Performance

The first objective of this study was to investigate whether TQM within Abu Dhabi's public-service sector positively affects its sustainability performance. Based on the literature relating to TQM and sustainability performance, *H1* was thus developed as follows:

H1: TQM in Abu Dhabi's public sector has a significant and positive impact on its sustainability performance.

The regression path between TQM and sustainability performance was analyzed using AMOS v.23 (Table 5.9) by considering them as second-order constructs. TQM comprised five first-order constructs embedded in Abu Dhabi's ADAEP model relating to quality management within the public sector: leadership (LED); people (PPL); processes (PRS); strategy and policy (SGP); and partnerships and resources (PDR). Sustainability performance was measured using three first-order constructs: environmental sustainability (ENV); social sustainability (SCL); and economic sustainability (ECN). The R^2 values for the first-order constructs of TQM ranged between 0.609 and 0.778, suggesting that the second-order construct, TQM, was adequately explained by the first-order constructs. The R^2 values for sustainability performance's first-order constructs were between 0.601 and 0.723, thus suggesting that sustainability performance is significantly explained by its first-order constructs (ENV, SCL, and ECN).

Having confirmed the validity and reliability of the above second-order constructs, the results showed that the direct relationship between TQM and sustainability performance was statistically significant and positive ($\beta=0.566$; $p<0.05$), thus supporting *H1*. Very few studies

1 have empirically investigated the association between TQM and sustainability performance
2 concerning all of its key elements (economic, social, and environmental dimensions) in a single
3 study. Concerning the facets of sustainability performance, this study found that social
4 ($\beta=0.767$; $p<0.05$) and environmental ($\beta=0.780$; $p<0.05$) performance were the most
5 significant aspects relating to the UAE public service sector's sustainability performance. This
6 finding supports those of Abbas (2020), Li *et al.* (2018), and Zhu *et al.* (2013), who found a
7 strong impact of TQM on the social and environmental performance of private sector firms.

8 The economic dimension of sustainability performance in the public sector was, on the other
9 hand, revealed to be insignificant ($\beta=0.882$; $p>0.05$). This finding is consistent with those of
10 Kearney and Berman (2018), and Wynen *et al.* (2016), while inconsistent with those of Al-
11 Dhaafri *et al.* (2016), Dahlgaard-Park *et al.* (2018), and Gomes *et al.* (2019), who found a
12 positive impact of TQM on organizational performance. In the present study, organizational
13 performance was defined as firm outcomes, such as financial performance, product market
14 performance, and shareholder return (Richard *et al.*, 2009), thereby reflecting economic
15 sustainability. Hence, it is apparent that the TQM applications of Abu Dhabi's public-service
16 sector (ADAEP model) apparently focus on enhancing its environmental and social
17 sustainability performance rather than economic sustainability performance. This finding can
18 be attributed to the fact that the public sector relies extensively on the provision of services to
19 the public rather than offering services to earn a profit as the private sector does. This finding
20 provides a new empirical insight into the study of the public sector's TQM and sustainability
21 performance; the above studies, which were compared and contrasted with the current study,
22 were conducted in the private sector context.

6.3 Elements of Total Quality Management (TQM) and Sustainability Performance

The elements of the TQM construct were the five components of ADAEP model adopted by Abu Dhabi's public-service sector: (1) leadership; (2) people; (3) processes; (4) strategy and policy; and (5) partnerships and resources. Hence, five sub-hypotheses relating to the elements of TQM and sustainability performance were developed to be tested as follows:

H1a: Leadership positively affects Abu Dhabi public sector's sustainability performance.

H1b: People positively affects Abu Dhabi public sector's sustainability performance.

H1c: Strategy and policy positively affects Abu Dhabi public sector's sustainability performance.

H1d: Partnerships and resources positively affects Abu Dhabi public sector's sustainability performance.

H1e: Processes positively affects Abu Dhabi public sector's sustainability performance.

The structural model for TQM, service innovation, and sustainability performance revealed that leadership ($\beta=0.798$; $p<0.05$), people ($\beta=0.810$; $p<0.05$), processes ($\beta=0.850$; $p<0.05$), and partnerships and resources ($\beta=0.834$; $p<0.05$) were the most statistically significant elements of the ADAEP quality management model (TQM-based) affecting Abu Dhabi public sector's sustainability performance, while strategy and policy ($\beta=0.846$; $p>0.05$) was revealed to be statistically insignificant. Hence, *H1a*, *H1b*, *H1d*, and *H1e* were accepted, while *H1c* was rejected.

Hence, the ADAEP model can be viewed as one clearly showing that TQM aspects in Abu Dhabi's public sector have a positive effect on the different performance dimensions of sustainability (environmental, social, and economic) in various ways. Concerning the leadership aspect of TQM, the study showed a significant and positive effect on environmental and social sustainability performance within Abu Dhabi's public service sector. Very few studies have found such an effect for leadership on sustainability performance. However, some studies have revealed that the leadership aspect of TQM has a significant effect on organizational performance (Shafiq *et al.*, 2019; Utami & Harahap, 2019), reflecting economic sustainability as referred to in the present study. According to Oakland (2011, p. 517), TQM should start with the top and middle management, where serious commitments to quality and leadership must be demonstrated. In the present study, it is implied that effective leadership in relation to TQM not only contributes to economic sustainability, but also to social and environmental sustainability. Russo and Fouts (1997) argued that environmental sustainability can produce economic benefits, thus improving organizational performance.

The second element of TQM, people, similarly had a significant and positive effect on social and environmental sustainability. This is evidently true as the people can also be linked to sustainability performance, particularly the social sustainability aspect, because it considers employees' needs and behaviors throughout TQM applications. Employee management is the degree to which employees in an organization take part in human resource management programs, such as training and development, performance appraisal, and promotion, which empower employees to increase their skills in TQM-related procedures (Mosadeghrad, 2014). Employees (people) should be acquainted with how a firm's quality policies affect their jobs and motivation, promote their development, and continuously enhance their work output/productivity (Mahmood *et al.*, 2015), thereby improving welfare and motivation and fulfilling their development needs, which are deemed to be aspects of social sustainability.

1 The third element of the ADAEP TQM model, strategy and policy, however, was reported as
2 having an insignificant relationship with sustainability performance. This finding implies an
3 inconsistency with the existing literature. For example, strategy and policy aims to attempt to
4 create strong ties with various stakeholders, such as suppliers, business partners, and customers
5 (Baird *et al.*, 2011). An effective system of strategic quality planning and policymaking can
6 enhance the product quality and, consequently, customer satisfaction, employee benefits, and
7 organizational performance (Cheung & To, 2010), reflecting economic and social
8 sustainability performance.

9 The fourth and fifth elements of the ADAEP TQM model (partnerships and resources; process),
10 were significant in relation to social and environmental sustainability performance. These
11 findings are largely consistent with the extant literature. For example, partnerships with
12 suppliers and the efficient allocation and utilization of resources can facilitate the achievement
13 of sustainability goals (economic, social, and environmental sustainability) (Chardine-
14 Baumann & Botta-Genoulaz, 2014; Nguyen *et al.*, 2018). Further, according to Nguyen *et al.*
15 (2018), process management can contribute to economic and environmental sustainability,
16 which can be improved by the reduction both of waste and material consumption. This study,
17 however, found no empirical evidence for the link between the TQM elements of partnerships
18 and resources and process management and economic sustainability in the context of the public
19 sector service providers [in Abu Dhabi](#).

20 However, due to limited studies in this area, further research is required to empirically
21 investigate how these TQM elements of ADAEP model can be linked to all three dimensions
22 of sustainability performance (economic, social, and environmental).

6.4 Total Quality Management (TQM) and Service Innovation

The second objective of this study was to examine the relationship between TQM and service innovation within Abu Dhabi's public sector organizations. Hence, the following hypothesis was developed:

H2: TQM positively affects service innovation within Abu Dhabi's public sector organizations.

The results revealed that TQM significantly and positively affects service innovation ($\beta=0.619$; $p<0.05$), thus supporting *H2*. Further, the results showed that organizational innovation is the most significant aspect of the service innovation construct on which TQM had a significant impact, while product and process innovation showed no significant impact. This finding contributes to addressing the lack of literature relating to the relationship between TQM and service innovation. A few empirical studies have investigated the association between TQM and service innovation in the existing literature. For example, Khan and Naeem (2018) found that quality practices can improve service innovation. However, very few studies have examined their links to the aspects of service innovation, such as product and process innovation and organizational innovation.

A similar relationship between TQM and innovation was found by Abu-Salim *et al.* (2019) in Abu Dhabi's private manufacturing and service firms. However, the current study contributes to filling the gap in the literature relating to whether TQM can affect service innovation in the public sector.

6.5 Service Innovation and Sustainability Performance

To examine the link between service innovation and sustainability performance, the following hypothesis was constructed:

H3: Service innovation in Abu Dhabi's public sector positively drives its sustainability performance.

The results suggest that service innovation significantly leads to sustainability performance in Abu Dhabi's public sector ($\beta=0.325$; $p<0.05$), hence supporting *H3*. Further, social and environmental sustainability were proposed to be the most statistically significant dimensions related to sustainability performance. This finding is consistent with studies conducted in the private sector. For example, Lyons *et al.* (2007) asserted that service innovation improves customer value, implying improved social sustainability performance. Moreover, the relationship between other stakeholders can be changed by service innovation while also having an effect on customer value and employee relations (Lyons *et al.*, 2007) (e.g. customer satisfaction, customer focus, employee performance, and incentive mechanism), thereby improving social sustainability performance. Service innovation can also have environmental effects (e.g. environmental thinking, environmental services) that can enhance environmental sustainability (Horng *et al.*, 2016; Løvlie *et al.*, 2008). These findings contribute to the current service-innovation- and sustainability-related literature as studies specifically focusing on service innovation and sustainability performance are still lacking (Calabrese *et al.*, 2018).

6.6 Mediation Effect of Service Innovation on the Link Between Total Quality Management (TQM) and Sustainability Performance

Finally, the study critically investigated the mediation effect of service innovation on the association between TQM and sustainability performance. Hence, the following hypothesis was developed:

H4: Service innovation in Abu Dhabi's public sector positively mediates the relationship between its TQM applications and sustainability performance.

IBM AMOS v.23 was used to identify the indirect effect of service innovation and their statistical significance via bootstrapping. The results showed that service innovation partially mediates ($\beta=0.350$; $p<0.05$) the association between TQM and sustainability performance (Table 5.10), thus supporting *H4*. Hence, this study concludes that TQM applications in Abu Dhabi's public sector organizations play a partial role in improving sustainability performance through the promotion of service innovation. In particular, organizational innovation was suggested to be critical for service innovation in the public sector, thereby improving the relationship between TQM and sustainability performance in Abu Dhabi's public sector. The originality of this study is further demonstrated by this finding as very few studies have examined the mediation effect of service innovation on the relationship between TQM and sustainability performance.

6.7 Chapter Summary

This chapter has discussed the results presented in Chapter 4 in relation to the pertinent literature reviewed in Chapter 2 and the developed hypotheses. Accordingly, the findings relating to the direct relationships between TQM, service innovation, and sustainability performance, as well as the mediating effect of service innovation on the connection between

1 TQM and sustainability performance have been discussed in the context of public sector
2 organizations in the UAE. This chapter has further highlighted the gaps in the literature and
3 how the findings contribute to addressing these gaps. In particular, the discussion has
4 elaborated how the lack of studies with regard to relationships between three dimensions of
5 sustainability performance (economic, social, and environmental performance), TQM
6 elements, and service innovation in public sector have been addressed by the current study. In
7 Chapter 6, conclusions, theoretical and practical implications, as well as limitations and further
8 research directions are elucidated.

9

CHAPTER 7: CONCLUSION, IMPLICATIONS, LIMITATIONS, AND FURTHER RESEARCH DIRECTIONS

7.1 Introduction

In the previous chapter, the results of the study were discussed and elaborated in relation to the reviewed literature in Chapter 2. Accordingly, the findings regarding the relationships between TQM, service innovation, and sustainability performance, as well as the mediating role of service innovation on the relationship between TQM and sustainability performance, were discussed from the perspective of the Abu Dhabi's public service sector organizations. The previous chapter also highlighted how the lack of studies relating to the interactions of TQM, service innovation, and sustainability performance was addressed.

In this chapter, the entire dissertation is summarized, including concluding remarks, implications, and further research directions. First, a summary of the research objectives and the study's conclusions based on the results is provided. Subsequently, the theoretical and practical implications of the study for Abu Dhabi's public sector organizations are discussed. The chapter concludes by detailing the study's limitations and future research directions.

7.2 Conclusions

The objective of this study was to critically examine the structural association between TQM, service innovation, and sustainability performance in Abu Dhabi's public sector. The findings suggested that TQM elements in Abu Dhabi's public sector, such as leadership, people, and partnerships and resources, have a significant effect both on service innovation and sustainability performance in the public sector of Abu Dhabi. These findings are consistent with those of Al-Dhaafri *et al.* (2016), Dahlgaard-Park *et al.* (2018), Gomes *et al.* (2019), Lo

1 and Chai (2012), Li *et al.* (2018), and Mateos-Ronco and Mezquida, (2018), whose focus was
2 on the private sector. The findings indicated that partnerships and resources, people, and
3 leadership in the public sector are vital TQM elements for Abu Dhabi's public sector
4 (exemplified in the ADAEP model) that can boost sustainability performance.

5 This study also considered all three TBL/CSR dimensions (environmental, economic, and
6 social) (Tate & Bals, 2018); previous TQM studies have mostly focused on only one dimension
7 of sustainability performance, such as environmental sustainability (Heras-Saizarbitoria &
8 Boiral, 2013; Li *et al.*, 2018), social sustainability (Lo & Chai, 2012; Pimentel & Major, 2016),
9 and economic sustainability (Al-Dhaafri *et al.*, 2016; Gomes *et al.*, 2019). Also, the context for
10 these studies was the private sector's sustainability performance. However, the present study
11 revealed that only the social and environmental sustainability performance dimensions were
12 significant within Abu Dhabi's public service sector.

13 A few studies (Abbas 2020; Li *et al.*, 2018; Zhu *et al.*, 2013) have also found the social and
14 environmental performance dimensions to be the most significant dimensions of sustainability
15 performance resulting from TQM applications in the private sector. In contrast, the
16 insignificant result found relating to economic sustainability and TQM within the public sector
17 is consistent with only a limited number of prior studies (Berman, 2015; Dahlgaard-Park *et al.*,
18 2018; Kearney & Berman, 2018; Wynen *et al.*, 2016), which did not find any significant
19 positive effect of TQM on economic performance in the private sector organizations; most
20 studies (Al-Dhaafri *et al.*, 2016; Dahlgaard-Park *et al.*, 2018; Gomes *et al.*, 2019) have revealed
21 a positive effect of TQM on the private sector's organizational performance, referred to as
22 economic sustainability. This study, therefore, concludes that the TQM application (following
23 the ADAEP model) adopted by Abu Dhabi's public sector is strongly linked both to enhancing
24 environmental and social sustainability performance, but that economic sustainability

performance has a low priority. Hence, it was concluded that the public sector of Abu Dhabi relies extensively on service offerings to the public in order to contribute to the society and environment rather than earning financial profit as the private sector earn.

The findings of this study further support the relationship between TQM and service innovation performance in the public sector, which has not yet been significantly studied in the extant literature, although a few studies examining the association between quality improvements and innovation do exist. Mättö (2019), for example, stressed that the lack of service innovation can lead to TQM failure. Nonetheless, the results of this study imply that successful TQM adoption can enable successful service innovation. Organizational innovation and product and process innovation are equally critical for service innovation.

Additionally, the results of the study demonstrate that service innovation leads to sustainability performance in Abu Dhabi's public sector. This finding is consistent with: Aas and Pedersen (2010), who found that service innovation has the ability to improve financial performance (economic sustainability performance); Lyons *et al.* (2007), who stated that service innovation improves customer value (social sustainability performance); and Løvlie *et al.* (2008), who found that service innovation has environmental effects (environmental sustainability performance).

It was also revealed that service innovation has an important role through its partial mediation effect between TQM and sustainability performance in Abu Dhabi's public sector. Hence, this study concludes that TQM in Abu Dhabi's public sector organizations plays a partial role in improving sustainability performance through the promotion of service innovation. The elements of TQM that were shown to have a statistically significant impact on sustainability performance and service innovation were leadership, people, and process. The elements of sustainability performance that were statistically significant were social and environmental

sustainability performance. In view of this, it was ultimately concluded that TQM elements such as leadership, people, and process, are equally vital for improving organizational innovation and product and process innovation, which are critical for service innovation, thereby improving social and environmental sustainability performance within Abu Dhabi's public sector.

7.3 Theoretical Implications

This study contributes to the lack of extant literature focusing both on TQM and sustainability performance by examining the impact of TQM practices, which are being adopted by Abu Dhabi's public sector following the ADAEP model, on service innovation and sustainability performance. First, this study contributes to the lack of empirical evidence explaining the association between TQM and the three facets of sustainability performance in the public service sector. Although a few studies have shown the significant impact of a single aspect of sustainability performance (economic, social, or environmental), they have been in the private sector context (Abbas, 2020, Dahlggaard-Park *et al.*, 2018; Kearney & Berman, 2018, Li *et al.*, 2018). The findings of the present study, however, confirm that the social and environmental dimensions are the most significant dimensions for the public sector's sustainability performance concerning TQM and service innovation, whereas the economic dimension was found to be insignificant. The public sector's prioritization of social and environmental sustainability performance over economic sustainability performance is thus implied. This theoretical implication is likely due to the difference between the private (profit-oriented) and the public sector (public-service-oriented) in terms of their setting and the goals they aim to achieve.

Further, empirical evidence showed that four of the TQM practices included in the ADAEP model (leadership, people, process, and partnerships and resources) play a substantial role in

enhancing sustainability performance in the public sector. Further, the results revealed the validity of the above TQM elements as a latent construct consisting of these four dimensions, evidently showing TQM to be a robust construct to measure the public sector's quality management effectiveness.

The findings of the study also support the relationship between TQM and service innovation performance in the public sector, which has not yet been significantly studied in the extant literature, despite a few studies regarding the association between quality improvements and innovation existing. Mättö (2019) and Gambi *et al.* (2020), for example, stressed that the lack of service innovation can lead to TQM failure. A similar relationship between TQM and innovation outcome was found by Abu-Salim *et al.* (2019) in Abu Dhabi's private manufacturing and service firms. However, the current study's finding contributes to addressing the lack of studies relating to how TQM can affect service innovation in the public sector. The results of this study imply that the successful TQM enables successful service innovation in Abu Dhabi's public service sector. Organizational innovation and product and process innovation are equally vital for service innovation in the public sector.

The study also demonstrates that service innovation in Abu Dhabi's public service sector has a significant association with the social and environmental dimensions of sustainability performance. Hence, it is implied that service innovations in Abu Dhabi's public sector are more environmentally and socially responsible, but that little attention is paid to economic sustainability. This suggests that service innovation can provide the public sector with positive environmental effects, while providing social benefits to stakeholders. The resulting effects of service innovation on customer/beneficiary value (e.g. customer satisfaction and customer focus) and employee relations (e.g. employee performance and incentive mechanisms) enhance the social sustainability performance of the public sector.

This study also helps fill the gap in the current literature as to how service innovation can mediate the relationship between TQM and sustainability performance in the public sector. It provides empirical evidence supporting that service innovation partially mediates the above-mentioned relationship. The findings of the study thus extend current understanding concerning how TQM influences sustainability performance and further explains the mechanism by which TQM can encourage service innovation which, in turn, enhances the sustainability performance of the public sector.

7.4 Practical Implications

The findings suggest that the public service sector's TQM practices and service innovation in the UAE have a profound impact on social and environmental sustainability rather than economic sustainability. This implies that the public sector in the UAE sees quality as a fundamental goal for the public services provided by governments (Wynen *et al.*, 2016). Unlike the private sector, the main goal of any public sector organization is to meet the needs of its societies/users within the constraints of available budget and abilities.

Moreover, drawing on TQM elements, this study supports policymakers and managers in public sector organizations, particularly in developing Middle Eastern countries, such as the UAE, in making their strategic decisions focusing on TQM. Adopting the five dimensions of TQM (ADAEP model) across Abu Dhabi's public organizations will enable government departments to deliver innovative services to their beneficiaries, thereby enhancing environmental, social, and economic sustainability dimensions.

The UAE government is currently involved in various TQM- and service-innovation-related applications. For example, Abu Dhabi's government's involvement in benchmarking, reengineering, and six sigma, and the implementation of service innovation, such as

administrative development (e.g. smart government) and service delivery, is inspiring the promotion of quality in its public sector services and the achievement of sustainable development. Nevertheless, the current study notes that such initiatives are still in an emerging stage (Ajmal *et al.*, 2016; Mansour & Jakka, 2013), requiring more studies examining the effectiveness such efforts in relation to the sustainability of the public sector. The UAE's [emirates including Abu Dhabi](#) has made substantial progress in sustainable development since signing up to the United Nations' Sustainable Development Goals (UNSDGs) framework upon its establishment in 2015 (Wyman, 2018). Although the country has made significant progress since then by shaping the National Agenda, creating dedicated governance, and employing various initiatives for improving sustainability in the country, this study's findings reveal that its current TQM applications and service innovation efforts do not greatly improve its economic sustainability. This requires more robust and upgraded public TQM policies, targeting the economic dimension of sustainability performance in the UAE, in addition to its social and environmental sustainability dimensions.

TQM is also going to play a critical role in the wake of current uncertainties in supply chains, whereby innovative ideas should facilitate sustainable strategies (Jiménez-Jiménez *et al.*, 2019). Unforeseeable disruptions (such as COVID-19) in the market may require technical innovations in the development and distribution of new services to maintain quality and sustainability in the market (Volberda *et al.*, 2013). Moreover, TQM practices may enforce some innovative changes in terms of organizational structure, marketing strategies, and information management (Walker *et al.*, 2015). Although the results of this study predominantly reflect the public sector context, organizations in the private sector also need a constant support from authorities to survive in today's competitive market.

7.5 Limitations and Recommendations for Future Research

Undoubtedly, this study has a few limitations. The sample of the study was limited to 433 employees from eight public sector organizations, operating in the sectors of health, education, ports and transport, digital government, economic development, municipality, police, and land and real estate, and all located in the emirate of Abu Dhabi in the UAE. These public sector organizations, however, should be representative of those existing across the entire country to improve the generalizability of the results. As stated by Sarker and Al Athmay (2017), there are 17 ministries and 32 independent government authorities in the context of public service organizations in the UAE. Hence, it might prove fruitful to expand the current sample size to incorporate other public sector organizations in [other emirates of the UAE](#) to extend the current understanding of TQM, service innovation, and sustainability performance.

More dimensions of TQM practices can be also integrated into the current measurement model (ADAEP model) used by the study. For instance, the ADAEP model does not comprise other vital facets reflecting effective TQM practices, such as customer focus, knowledge management, and culture, which can enhance the sustainability performance of organizations (Elshaer & Augustyn, 2016; Fatima & Mahaboob, 2018; Lau *et al.*, 2004). Hence, researchers and scholars are encouraged to conduct further empirical investigations into the association between TQM, service innovation, and sustainability performance by increasing the number of samples from many public organizations in the UAE and other developing countries, as well as integrating other elements into the current study's TQM construct, such as customer focus, culture, and knowledge management (Abbas, 2020).

REFERENCES

- Aas, T. H., & Pedersen, P. E. (2010). The impact of service innovation on firm-level financial performance. *The Service Industries Journal*, 31(13), 2071–2090.
- Abbas, J. (2020). Impact of total quality management on corporate sustainability through the mediating effect of knowledge management, *Journal of Cleaner Production*, 244, 1–11.
- Abbas, J., & Sagsan, M. (2019). Impact of knowledge management practices on green innovation and corporate sustainable development: A structural analysis. *Journal of Cleaner Production*, 229, 611–620.
- Abu-Salim, T., Sundarakani, B., & Lasrado, F. (2019). The relationship between TQM practices and organisational innovation outcomes: Moderating and mediating the role of slack. *The TQM Journal*, 31(6), 874–907.
- ADAEP. (2007). *About the Government Excellence System*. ADAEP. <https://www.adaep.ae/en/governmentexcellencesystem/Pages/default.aspx>
- Adams, C. A., Stephen, M., & Zahirul, H. (2014). Measurement of sustainability performance in the public sector. *Sustainability Accounting, Management and Policy Journal*, 5(1), 46–67.
- Ajmal, M. M., Tuomi, V., Helo, P. T., & Sandhu, M. A. (2016). TQM practices in public sector: Case of Finnish healthcare organizations. *International Journal of Information Systems in the Service Sector*, 8(1), 34–44.
- Akgün, A., Ince, H., Imamoglu, S., Keskin, Z., & Kocoglu, İ. (2014). The mediator role of learning capability and business innovativeness between total quality management and financial performance. *International Journal of Production Research*, 52(3), 888–901.
- Al-Dhaafri, H., Al-Swidi, A., & Yusoff, R. (2016). The mediating role of total quality management between the entrepreneurial orientation and the organizational performance. *The TQM Journal*, 28(1), 89–111.
- Alharbi, K., Al-Matari, E. M., & ZienYusoff, R. (2016). The impact of total quality management (TQM) on organisational sustainability: The case of the hotel industry in Saudi Arabia: Empirical study. *The Social Sciences*, 11(4), 3468–3473.
- Amin, M., Aldakhil, A. M., Wu, C., Rezaei, S., & Cobanoglu, C. (2017). The structural relationship between TQM, employee satisfaction and hotel performance. *International Journal of Contemporary Hospitality Management*, 29(4), 1256–1278.
- Androwis, N., Sweis, R., Tarhini, A., Moarefi, A., & Hosseini Amiri, M. (2018). Total quality management practices and organizational performance in the construction chemicals companies in Jordan. *Benchmarking: An International Journal*, 25(8), 3180–3205.
- Annual Economic Report (2019), Workforce in the UAE, <https://u.ae/en/information-and-services/jobs/uae-workforce>

- 1
- 2 Arbuckle, J. L. (2005), *AMOS 6.0 user's guide* (Vol. 541). AMOS Development Corporation.
- 3 Ashour, A. S. (2004). *Integrity, transparency and accountability in public sector human*
- 4 *resources management* (RAB/01/006). United Nations, Department of Economic and
- 5 Social Affairs, Division for Public Administration and Development Management.
- 6 Awang, Z. H. (2012). *A handbook on SEM: Structural equation modeling* (4th ed.).
- 7 University Teknologi MARA Kelantan.
- 8 Baird, K., Hu, K. J., & Reeve, R. (2011). The relationships between organizational culture,
- 9 total quality management practices and operational performance. *International*
- 10 *Journal of Operations & Production Management*, 31(7), 789–814.
- 11 Bajaj, S., Garg, R., & Sethi, M. (2018). Total quality management: A critical literature review
- 12 using Pareto analysis. *International Journal of Productivity and Performance*
- 13 *Management*, 67(1), 128–154.
- 14 Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of
- 15 innovation. *Management Decision*, 47(8), 1323–1339.
- 16 Barouch, G., & Kleinhans, S. (2016). Learning from criticisms of quality management.
- 17 *International Journal of Quality and Service Sciences*, 7(2/3), 201–216.
- 18 Berman, E. M. (2015). *Performance and productivity in public and non-profit organization*
- 19 (2nd ed.). Routledge.
- 20 Bou-Llusar, J. C., Escrig-Tena, A. B., Roca-Puig, V., & Beltrán-Martín, I. (2009). An
- 21 empirical assessment of the EFQM Excellence Model: Evaluation as a TQM
- 22 framework relative to the MBNQA Model. *Journal of Operations Management*,
- 23 27(1), 1–22.
- 24 Boyne, G. A., & Walker, R. M. (2002). Total quality management and performance: An
- 25 evaluation of the evidence and lessons for research on public organizations. *Public*
- 26 *Performance & Management Review*, 26(2), 111–131.
- 27 Brah S. A., Wong J. L., & Rao B. M. (2000). TQM and business performance in the service
- 28 sector: A Singapore study. *International journal of Operation Production*
- 29 *Management*, 20(11), 1293–1312.
- 30 Bryman, A., & Bell, E. (2015). *Business research methods* (4th ed.). Oxford University Press.
- 31 Burke, R. J., & Martin, G. (2016). *Corporate reputation: Managing opportunities and*
- 32 *threats*. Routledge.
- 33 Byrne, B. M. (2010). *Multivariate applications series. Structural equation modeling with*
- 34 *AMOS: Basic concepts, applications, and programming* (2nd ed.). Routledge.
- 35 Calabrese, A., Castaldi, C., Forte, G., & Levialdi, N.G. (2018). Sustainability-oriented service
- 36 innovation: An emerging research field. *Journal of Cleaner Production*, 193, 533–
- 37 548.
- 38 Chang, S. J., Van Witteloostuijn, A., & Eden, L. (2010). From the editors: Common method
- 39 variance in international business research. *Journal of International Business Studies*,
- 40 41, 178–184.

- 1 Chardine-Baumann, E., & Botta-Genoulaz, V. A. (2014). Framework for sustainable
2 performance assessment of supply chain management practices. *Computers &*
3 *Industrial Engineering*, 76, 56–61.
- 4 Chen, J. S., Tsou, H. T., & Ching, R. K. (2011). Co-production and its effects on service
5 innovation. *Industrial Marketing Management*, 40(8), 1331–1346.
- 6 Chen, J., Singh, S. K., Del Giudice, M., & El-Kassar, A. N. (2019). Environmental ethics,
7 environmental performance, and competitive advantage: role of environmental
8 training. *Technological Forecasting and Social Change*, 146, 203–211.
- 9 Cheung, M.F.Y., & To, W.M. (2010). Management commitment to service quality and
10 organizational outcomes. *Managing Service Quality*, 20(3), 259–272.
- 11 Child, D. (2006), *The essentials of factor analysis* (3rd ed.), Continuum International
12 Publishing.
- 13 Chronis, P., & Zombanakis, G. A. (2016). *An evaluation of policies for fiscal and external*
14 *sustainability during the recent Greek economic crisis*. Bank of Greece.
- 15 CIA. (2017), *United Arab Emirates environment - Current issues*,
16 https://www.indexmundi.com/united_arab_emirates/environment_current_issues.html
- 17 CNBC. (2020), *UAE urges public to stay at home, arrests European national for flouting*
18 *bans on his Instagram*. [https://www.cnn.com/2020/03/23/coronavirus-uae-urges-](https://www.cnn.com/2020/03/23/coronavirus-uae-urges-public-to-stay-home-arrests-european-man-for-mocking-bans-on-his-instagram.html)
19 [public-to-stay-home-arrests-european-man-for-mocking-bans-on-his-instagram.html](https://www.cnn.com/2020/03/23/coronavirus-uae-urges-public-to-stay-home-arrests-european-man-for-mocking-bans-on-his-instagram.html)
- 20 Collis, J., & Hussey, R. (2017). *Business research: A practical guide for undergraduate and*
21 *postgraduate students* (4th ed.). Red Globe Press.
- 22 Corredor, P., & Goñi, S. (2011). TQM and performance: Is the relationship so obvious?
23 *Journal of Business Research*, 64(8), 830–838.
- 24 Crane, A., Henriques, I., Husted, B. W., & Matten, D. (2017). Measuring corporate social
25 responsibility and impact: Enhancing quantitative research design and methods in
26 business and society research. *Business & Society*, 56(6), 787–795.
- 27 Dahlgaard-Park, S. M., Reyes, L., & Chen, C. K. (2018). The evolution and convergence of
28 total quality management and management theories. *Total Quality Management &*
29 *Business Excellence*, 29(9–10), 1108–1128.
- 30 Dewhurst, F., Lorente, A. R. M., & Dale, B. G. (1999). Total quality management and
31 information technologies: An exploration of the issues. *International Journal of*
32 *Quality & Reliability Management*, 16(4), 392–406.
- 33 Durairatnam, S., Chong, S. C., & Jusoh, M. (2019). People-related TQM practices,
34 organisational culture, organisational justice and employee work-related attitudes for
35 quality performance: A research agenda. *Global Journal of Management and*
36 *Business Research*, 19(4), 1–10.
- 37 Elder, M., Bengtsson, M., & Akenji, L. (2016). An optimistic analysis of the means of
38 implementation for sustainable development goals: Thinking about goals as means.
39 *Sustainability*, 8(9), 1–24.

- 1 Elshaer, I .A., & Augustyn, M. M. (2016). Direct effects of quality management on
2 competitive advantage. *International Journal of Quality & Reliability Management*,
3 33(9), 1286–1310.
- 4 Evans, J. R., & Mathur, A. (2018). The value of online surveys: a look back and a look ahead.
5 *Internet Research*, 28(4), 854–887.
- 6 Falcone, P. M. (2014). Sustainability transitions: A survey of an emerging field of research.
7 *Environmental Management and Sustainable Development*,3(2), 61–83.
- 8 Fatima, S., & Mahaboob, S. M. (2018), Total quality management practices and
9 organizational performance - An MBNQA model based study of two hospitals.
10 *Journal of Management*, 7(4), 27–38.
- 11 Ferraz, I. N., & de Melo Santos, N. (2016). The relationship between service innovation and
12 performance: A bibliometric analysis and research agenda proposal. *RAI Revista de*
13 *Administração e Inovação*, 13(4), 251–260.
- 14 Fornell, C.. & Larcker, D. F. (1981). Structural equation models with unobservable variables
15 and measurement error: algebra and statistics, *Journal of Marketing Research*, 18(3),
16 382–388.
- 17 Forsman, H. (2015). *Small firms as innovators: From innovation to sustainable growth* (Vol.
18 25). World Scientific.
- 19 Forsman, H., & Temel, S. (2016). From a non-innovator to a high-innovation performer:
20 Networking as a driver. *Regional Studies*, 50(7), 1140–1153.
- 21 Freeman, R. E. (1984), *Strategic management: A stakeholder approach*. Pitman.
- 22 Gambi, L. D. N., Lizarelli, F. L., Junior, A. R. R., & and Boer, H. (2020). The impact of
23 quality management practices on innovation: an empirical research study of Brazilian
24 manufacturing companies. *Benchmarking: An International Journal*, 28(3), 1059–
25 1082.
- 26 Georgiev, S., & Ohtaki, S. (2019). Critical success factors for TQM implementation among
27 manufacturing SMEs. *Benchmarking: An International Journal*, 27(2), 473–498.
- 28 Gieske, H., van Buuren, A., & Bekkers, V. (2016). Conceptualizing public innovative
29 capacity: A framework for assessment. *The Public Sector Innovation Journal*, 21(1),
30 1–25.
- 31 Gimenez-Espin, J., Martínez-Costa, D., & Jimenez-Jimenez, D. (2013). Organizational
32 culture for total quality management, *Total Quality Management & Business*
33 *Excellence*, 24(5–6), 678–692.
- 34 Goetsch, D. L., & Davis, S. B. (2010). *Quality management for organizational excellence:*
35 *Introduction to total quality* (6th ed.). Pearson.
- 36 Gomes, C., Small, M., & Yasin, M. (2019). Towards excellence in managing the public-
37 sector project cycle: A TQM context. *International Journal of Public Sector*
38 *Management*, 32(2), 207–228.
- 39 Gozum, S., & Aksayan, S. (2002). Guidelines for cross-cultural scale adaptation II:
40 Psychometric properties and cross-cultural comparison. *Journal of Nursing Research*
41 *Development*, 5, 3–14.

- 1 Gratton, C., & Jones, I. (2010). *Research methods for sports studies*. Taylor & Francis.
- 2 Grawe, S. J., Chen, H., & Daugherty, P. J. (2009). The relationship between strategic
3 orientation, service innovation, and performance. *International Journal of Physical*
4 *Distribution & Logistics Management*, 39(4), 282–300.
- 5 Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (2010). *Multivariate data*
6 *analysis* (7th ed.). Pearson.
- 7 Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2013). *A primer on partial least*
8 *squares structural equation modeling (PLS-SEM)*. Sage.
- 9 Hair Jr, J. F., Hult, G. T. M., Proksch, D., Sarstedt, M., Pinkwart, A., & Ringle, C. M. (2018).
10 Addressing endogeneity in international marketing applications of partial least
11 squares structural equation modeling. *Journal of International Marketing*, 26(3), 1–
12 21.
- 13 Hammer, J., & Pivo, G. (2017). The triple bottom line and sustainable economic development
14 theory and practice. *Economic Development Quarterly*, 31(1), 25–36.
- 15 Hanif, M. I., & Asgher, M. U. (2018). Service innovation and service innovation
16 performance: A study of banking services. *Pakistan Journal of Commerce and Social*
17 *Sciences (PJCSS)*, 12(2), 670–694.
- 18 Hart, S. (1995). A natural resource-based view of the firm. *Academy of Management Review*,
19 20, 986–1014.
- 20 Heras-Saizarbitoria, I., & Boiral, O. (2013). ISO 9001 and ISO 14001: Towards a research
21 agenda on management system standards. *International Journal of Management*
22 *Reviews*, 15(1), 47–65.
- 23 Hertog, P. D. (2000). Knowledge-intensive business services as coproducers of innovation.
24 *International Journal of Innovation Management*, 4(4), 491–528.
- 25 Holmes-Smith, P., Cunningham, E., & Coote, L. (2006). *Structural equation modelling: From*
26 *the fundamentals to advanced topics*. School Research, Evaluation and Measurement
27 Services, Melbourne.
- 28 Hollingworth, D., & Valentine, S. (2014). Corporate social responsibility, continuous process
29 improvement orientation, organizational commitment and turnover intentions.
30 *International Journal of Quality & Reliability Management*, 31(6), 629–651.
- 31 Horng, J.S., Wang, C.J., Liu, C.H., Chou, S.F., & Tsai, C.Y. (2016). The role of sustainable
32 service innovation in crafting the vision of the hospitality industry. *Sustainability*,
33 8(3), e223. <https://doi.org/10.3390/su8030223>
- 34 Hussain, M., Khan, M., Ajmal, M., & Khan, B. A. (2019). Supply chain quality management
35 and organizational performance. *Benchmarking: An International Journal*, 27(1),
36 232–249.
- 37 Isaksson, R. (2006). Total Quality management for sustainable development. *Business*
38 *Process Management Journal*, 12, 632–645.
- 39 Jiménez-Jiménez, D., Martínez-Costa, M., & Para-Gonzalez, L. (2019). Implications of TQM
40 in firm's innovation capability. *International Journal of Quality & Reliability*
41 *Management*, 37(2), 279–304.

- Johnsen, J. E., Miemczyk, J., & Howard, M. (2017). A systematic literature review of sustainable purchasing and supply research: Theoretical perspectives and opportunities for IMP-based research. *Industrial Marketing Management*, 61, 130–143.
- Junior, A. N., de Oliveira, M. C., & Helleno, A. L. (2018). Sustainability evaluation model for manufacturing systems based on the correlation between triple bottom line dimensions and balanced scorecard perspectives. *Journal of Cleaner Production*, 190, 84–93.
- Kang, J. S., Chiang, C. F., Huangthanapan, K., & Downing, S. (2015). Corporate social responsibility and sustainability balanced scorecard: The case study of family-owned hotels. *International Journal of Hospitality Management*, 48, 124–134.
- KanKam-Kwarteng, C., Gatsi, J. G., Donkor, J., & Acheampong, S. (2018). Service innovation and firm performance of SMEs auto service: The mediating role of pricing capability. *Archives of Business Research*, 6(8), 892–902.
- Kassem, R., Ajmal, M., Gunasekaran, A., & Helo, P. (2019). Assessing the impact of organizational culture on achieving business excellence with a moderating role of ICT. *Benchmarking: An International Journal*, 26(1), 117–146.
- Kearney, M.-L. (2009). Higher education, research and innovation: Charting the course of the changing dynamics of the knowledge society. In V. L. Meek, U. Teichler, & M.-L. Kearney (Eds.), *Higher education, research and innovation: Changing dynamics* (Report on the UNESCO Forum on Higher Education, Research and Knowledge 2001-2009) (pp. 7–24). UNESCO.
- Kearney, R. C., & Berman, E. M. (2018), *Public sector performance management, motivation, and measurement*. Taylor & Francis.
- Khaleej Times* (2018). *Winners of Abu Dhabi excellence awards honoured*.
<https://www.khaleejtimes.com/nation/abu-dhabi/winners-of-excellence-awards-honoured>
- Khalili, A., Ismail, M. Y., Karim, A. N. M., & Daud, M. R. C. (2019). Quality management practices and sustainable performance: Examining the role of soft TQM as mediator. *International Journal of Industrial and Systems Engineering*, 31(2), 250–277.
- Khan, B. A., & Naeem, H. (2018). Measuring the impact of soft and hard quality practices on service innovation and organisational performance. *Total Quality Management & Business Excellence*, 29(11/12), 1402–1426.
- Kline, R. (2011). Convergence of structural equation modeling and multilevel modeling. In M. Williams. & W.P. Vogt (Eds.), *The SAGE handbook of innovation in social research methods* (pp. 562–589). Sage.
- Kline, R. B. (2015). *Principles and practice of structural equation modeling*. Guilford Press.
- Kotlar, J., De Massis, A., Wright, M., & Frattini, F. (2018). Organizational goals: Antecedents, formation processes and implications for firm behavior and performance. *International Journal of Management Reviews*, 20, S3–S18.
- Krishnan, A. (2016). Implementation of quality initiatives in Indian public and private sector organizations: A comparative analysis. *International Journal of Quality & Reliability Management*, 33(2), 246–266.

- 1 Kuei, C., & Lu, M. H. (2013). Integrating quality management principles into sustainability
2 management. *Total Quality Management and Business Excellence*, 24(1–2), 62–78.
- 3 Kumar, K., & Prakash, A. (2019). Developing a framework for assessing sustainable banking
4 performance of the Indian banking sector. *Social Responsibility Journal*, 15(5), 689–
5 709.
- 6 Larsson, J., & Holmberg, J. (2018). Learning while creating value for sustainability
7 transitions: The case of Challenge Lab at Chalmers University of Technology.
8 *Journal of Cleaner Production*, 172, 4411–4420.
- 9 Laskar, N., & Gopal Maji, S. (2018). Disclosure of corporate sustainability performance and
10 firm performance in Asia. *Asian Review of Accounting*, 26(4), 414–443.
- 11 Lau, R., Zhao, X., & Xiao, M. (2004). Assessing quality management in China with MBNQA
12 criteria. *International Journal of Quality & Reliability Management*, 21(7), 699–713.
- 13 Lee, V. H., Ooi, K. B., Tan, B. I., & Chong, A. Y. L. (2010). A structural analysis of the
14 relationship between TQM practices and product innovation. *Asian Journal of*
15 *Technology Innovation*, 18(1), 73–96.
- 16 Li, D., Zhao, Y., Zhang, L., Chen, X., & Cao, C. (2018). Impact of quality management on
17 green innovation. *Journal of Cleaner Production*, 170, 462–470.
- 18 Lin, L. (2013). The impact of service innovation on firm performance. *The Service Industries*
19 *Journal*, 33(15–16), 1599–1632.
- 20 Lo, Q. Q., & Chai, K. H. (2012). Quantitative analysis of quality management literature
21 published in total quality management and business excellence (1996–2010). *Total*
22 *Quality Management & Business Excellence*, 23(6), 629–651.
- 23 Løvlie, L., Downs, C., & Reason, B. (2008). Bottom-line experiences: Measuring the value of
24 design in service. *Design Management Review*, 19(1), 73–79.
- 25 Lovric, M. (2014). *International encyclopaedia of statistical science*. Springer.
- 26 Lu, T., Tu, R., & Jen, W. (2011). The role of service value and switching barriers in an
27 integrated model of behavioural intentions. *Total Quality Management & Business*
28 *Excellence*, 22(10), 1071–1089.
- 29 Lusch, R. F., & Nambisan, S. (2015). Service innovation. *MIS Quarterly*, 39(1), 155–176.
- 30 Lyons, R. K., Chatman, J. A., & Joyce, C. K. (2007). Innovation in services: Corporate
31 culture and investment banking. *California Management Review*, 50(1), 174–191.
- 32 Lyytinen, K., & Rose, G. M. (2003). The disruptive nature of information technology
33 innovations: the case of internet computing in systems development organizations.
34 *Information Systems Quarterly*, 27(4), 557–595.
- 35 Mahmood, K., Qureshi, I. M. A., & Nisar, A. (2014). An empirical study on measurement of
36 performance through TQM in Pakistani aviation manufacturing industry. *International*
37 *Journal of Quality & Reliability Management*, 31(6), 665–680.
- 38 Mahmood, S., Qadeer, F., & Ahmed, A. (2015). The role of organizational learning in
39 understanding relationship between total quality management and organizational
40 performance. *Pakistan Journal of Commerce and Social Sciences*, 9(1), 282–302.

- 1 Manohar, S., Mittal, A., & Marwah, S. (2019). Service innovation, corporate reputation and
2 word-of-mouth in the banking sector. *Benchmarking: An International Journal*, 27(1),
3 406–429.
- 4 Mansour, A., & Jakka, A. (2013). Is total quality management feasible in a developing
5 context? The employees' perspective in the United Arab Emirates public sector.
6 *International Journal of Public Administration*, 36(2), 98–111.
- 7 Maravilhas, S., & Martins, J., (2019). Strategic knowledge management a digital
8 environment: Tacit and explicit knowledge in Fab Labs. *Journal of Business*
9 *Research*, 94, 353–359.
- 10 Marefat, D., & Faridfathi, A. (2015). Relationship between information technology and total
11 quality management in sport federations. *Journal of Applied Environmental and*
12 *Biological*, 5(3), 52–58.
- 13 Markard, J., Geels, F. W., & Raven, R. (2020). Challenges in the acceleration of
14 sustainability transitions. *Environmental Research Letters*, 15(8), e081001.
15 <https://doi.org/10.1088/1748-9326/ab9468>
- 16 Mateos-Ronco, A., & Mezquida, J. M. H. (2018). Developing a performance management
17 model for the implementation of TQM practices in public education centres. *Total*
18 *Quality Management & Business Excellence*, 29(5–6), 546–579.
- 19 Mättö, T. (2019). Innovation through implementation of a quality improvement method: A
20 Finnish public-sector case. *The TQM Journal*, 31(6), 987–1002.
- 21 McWilliams, A., Van Fleet, D., & Cory, K. (2002). Raising rivals' costs through political
22 strategy: An extension of the resource-based theory, *Journal of Management Studies*,
23 39, 707–723.
- 24 Mehra, S. (2018). Using asset-based criterion to implement quality management philosophy
25 in service operations to enhance business performance. *International Journal of*
26 *Quality & Reliability Management*, 35(10), 2195–2211.
- 27 Melkers J. E., & Willoughby, K. G. (2005). Models of performance measurement use in local
28 governments: Understanding budgeting, communication, and lasting effects. *Public*
29 *Administration Review*, 65(2), 180–191.
- 30 Mendes, L., & Dias, D. (2018). Corporate social responsibility and total quality management:
31 The stakeholders' value creation debate revisited. In J. Leitão, H. Alves, N. Krueger,
32 & J. Park (Eds.), *Entrepreneurial, innovative and sustainable ecosystems: Applying*
33 *quality of life research (best practices)* (pp. 255–283). Springer.
- 34 Milakovich, M. E. (2007). Total quality management in the public sector. *National*
35 *Productivity Review*, 10(2), 191–210.
- 36 Miranda, M. Q., Farias, J. S., de Araújo Schwartz, C., & de Almeida, J. P. L. (2016).
37 Technology adoption in diffusion of innovations perspective: introduction of an ERP
38 system in a non-profit organization. *RAI Revista de Administração e Inovação*, 13(1),
39 48–57.
- 40 Modgil, S., & Sharma, S. (2016). Total productive maintenance, total quality management and
41 operational performance: An empirical study of Indian pharmaceutical industry.
42 *Journal of Quality in Maintenance Engineering*, 22(4), 353–377.

- 1 Mohanty, R. P., & Lakhe, R. P. (2011). *TQM in the service sector* (5th ed.). Jaico Publishing
2 House.
- 3 Mosadeghrad, A. M. (2014). Essentials of total quality management: A meta-analysis.
4 *International Journal of Health Care Quality Assurance*, 27(6), 544–556.
- 5 Muhamad, M. R., Ebrahim, Z., & Hami, N. (2014, January). The influence of innovation
6 performance towards manufacturing sustainability performance. In *Proceedings of the*
7 *2014 International Conference on Industrial Engineering and Operations*
8 *Management, Bali, Indonesia, January 7–9, 2014* (pp. 2539–2547). IEOM Society.
9 <http://ieomsociety.org/ieom2014/pdfs/545.pdf>
- 10 Nair, A., & Markowski, E. (2016). Dynamic capabilities and organizational performance: A
11 meta-analytic evaluation and extension. *Journal of Management Studies*, 53(8), 1348–
12 1380.
- 13 Nawelwa, J., Sichinsawbwe, C., & Mwanza, B. G. (2015). An analysis of total quality
14 management (TQM) practices in Zambian secondary schools. *The TQM Journal*,
15 27(6), 716–731.
- 16 Ng, P. T. (2009). Relating quality and innovation: An exploration. *International Journal of*
17 *Quality and Innovation*, 1, 3–15.
- 18 Nguyen, M. H., Phan, A. C., & Matsui, Y. (2018). Contribution of quality management
19 practices to sustainability performance of Vietnamese firms. *Sustainability*, 10(2),
20 e375. <https://doi.org/10.3390/su10020375>
- 21 Nguyen, T. L. H., & Nagase, K. (2019). The influence of total quality management on
22 customer satisfaction. *International Journal of Healthcare Management*, 12(4), 277–
23 285.
- 24 Nunnally J.C. & Bernstein I. H. (1994), *Psychometric theory*. McGraw-Hill.
- 25 Oakland, J. (2011). Leadership and policy deployment: the backbone of TQM. *Total Quality*
26 *Management & Business Excellence*, 22(5), 517–534.
- 27 Ooi, K. B. (2014). TQM: A facilitator to enhance knowledge management? A structural
28 analysis. *Expert Systems with Applications*, 41(11), 5167–5179.
- 29 Özmen, Ö., Sârbu, R., Săseanu, A. S., & Toader, C. (2017). The European Foundation for
30 Quality Management (EFQM) excellence model in a in a low voltage switchgear
31 company. *Amfiteatru Economic*, 19(11), 1064–1076.
- 32 Pambreni, Y., Khatibi, A., Azam, S., & Tham, J. J. M. S. L. (2019). The influence of total
33 quality management toward organization performance. *Management Science Letters*,
34 9(9), 1397–1406.
- 35 Pimentel, L., & Major, M. (2016). Key success factors for quality management
36 implementation: Evidence from the public sector. *Total Quality Management &*
37 *Business Excellence*, 27(9–10), 997–1012.
- 38 Prajogo, D. I., & Sohal, A. S. (2006). The integration of TQM and technology/R&D
39 management in determining quality and innovation performance. *Omega*, 34(3), 296–
40 312.

- 1 Psomas, E. L., & Jaca, C. (2016). The impact of total quality management on service
2 company performance: Evidence from Spain. *International Journal of Quality &*
3 *Reliability Management*, 33(3), 380–398.
- 4 Public Sector Excellence. (2016). *Empowering excellence*. [http://psemagazine.com/the-abu-](http://psemagazine.com/the-abu-dhabi-awards-for-excellence-in-government-performance-2015/)
5 [dhabi-awards-for-excellence-in-government-performance-2015/](http://psemagazine.com/the-abu-dhabi-awards-for-excellence-in-government-performance-2015/)
- 6 Qasrawi, S. O., Pandi-Perumal, S. R., & BaHamam, A. S. (2017). The effect of intermittent
7 fasting during Ramadan on sleep, sleepiness, cognitive function, and circadian
8 rhythm. *Sleep and Breathing*, 21(3), 577–586.
- 9 Rad, A. M. M. (2006). The impact of organizational culture on the successful implementation
10 of total quality management. *The TQM Magazine*, 18(6), 606–625.
- 11 Randhawa, K., & Scerri, M. (2015). Service innovation: A review of the literature. In R.
12 Agarwal, W. Selen, G. Roos, & R. Green (Eds.), *The handbook of service innovation*
13 (pp. 27–51). Springer.
- 14 Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring organisational
15 performance: Toward methodological best practice, *Journal of Management*, 35(3),
16 718–804,
- 17 Russo, M., & Fouts, P. (1997). A resource-based perspective on corporate environmental
18 performance and profitability. *Academy of Management Journal*, 40, 534–559.
- 19 Sarker, A. E., & Al Athmay, A. A. A. R. A. (2017) The changing facets of public
20 administration in the United Arab Emirates. *International Journal of Public*
21 *Administration*, 41(10), 832–844.
- 22 Sashkin, M., & Kiser, K. J. (1993). *Putting total quality management to work: what TQM*
23 *means, how to use it, & how to sustain it over the long run*. Berrett-Koehler.
- 24 Saunders, M., Lewis, P., & Thornhill, A. (2016). *Research Methods for Business Students*
25 (7th ed.). Prentice Hall.
- 26 Schaltegger, S. (2011). Sustainability as a driver for corporate economic success:
27 Consequences for the development of sustainability management control. *Society and*
28 *Economy*, 33(1), 15–28.
- 29 Schaltegger, S., Hörisch, J., & Freeman, R. E. (2019). Business cases for sustainability: A
30 stakeholder theory perspective. *Organization & Environment*, 32(3), 191–212.
- 31 Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*.
32 Wiley.
- 33 Serrano Cinca, C., Mar Molinero, C., & Bossi Queiroz, A. (2003). The measurement of
34 intangible assets in public sector using scaling techniques. *Journal of Intellectual*
35 *Capital*, 4(2), 249–275.
- 36 Shafiq, M., Lasrado, F., & Hafeez, K. (2019). The effect of TQM on organisational
37 performance: Empirical evidence from the textile sector of a developing country using
38 SEM. *Total Quality Management & Business Excellence*, 30(1–2), 31–52.
- 39 Shahzad, M., Qu, Y., Javed, S. A., Zafar, A. U., & Rehman, S. U. (2020). Relation of
40 environment sustainability to CSR and green innovation: A case of Pakistani

- 1 manufacturing industry. *Journal of Cleaner Production*, 253, e119938.
2 <https://doi.org/10.1016/j.jclepro.2019.119938>
- 3 Sharma, S., & Modgil, S. (2019). TQM, SCM and operational performance: An empirical
4 study of Indian pharmaceutical industry. *Business Process Management Journal*,
5 26(1), 331–370.
- 6 Sila, I. (2018). Linking quality with social and financial performance: A contextual, ethics-
7 based approach. *Production and Operations Management*, 27(6), 1102–1123.
- 8 Silva, D. S., Moraes, G. H. S. M.d., Makiya, I. K., & Cesar, F. I. G. (2017). Measurement of
9 perceived service quality in higher education institutions: A review of HEDPERF
10 scale use. *Quality Assurance in Education*, 25(4), 415–439.
- 11 Snyder, H., Witell, L., Gustafsson, A., Fombelle, P., & Kristensson, P. (2016). Defining
12 service innovation: A review and synthesis. *Journal of Business Research*, 69(8),
13 2863–2872.
- 14 Soltani, E., & Wilkinson, A. (2020). TQM and performance appraisal: complementary or
15 incompatible? *European Management Review*, 17(1), 57–82.
- 16 Soltani, E., van der Meer, R., Williams, T., & Lai, P. (2006). The compatibility of
17 performance appraisal systems with TQM principles – Evidence from current
18 practice. *International Journal of Operations & Production Management*, 26(1), 92–
19 112.
- 20 Suárez-Barraza, M. F., & Ablanedo-Rosas, J. H. (2014). Total quality management
21 principles: Implementation experience from Mexican organisations. *Total Quality*
22 *Management and Business Excellence*, 25(5–6), 546–560.
- 23 Tabachnick, B. G., & Fidell, L. S. (2007). *Experimental designs using ANOVA*.
24 Thomson/Brooks/Cole.
- 25 Talapatra, S., & Uddin, M. K. (2019). Prioritizing the barriers of TQM implementation from
26 the perspective of garment sector in developing countries. *Benchmarking: An*
27 *International Journal*, 26(7), 2205–2224.
- 28 Talapatra, S., Uddin, M. K., Antony, J., Gupta, S., & Cudney, E. A. (2019). An empirical study
29 to investigate the effects of critical factors on TQM implementation in the garment
30 industry in Bangladesh. *International Journal of Quality & Reliability Management*,
31 37(9–10), 1209–1232.
- 32 Tasleem, M., Khan, N., & Nisar, A. (2019). Impact of technology management on corporate
33 sustainability performance: The mediating role of TQM. *International Journal of*
34 *Quality & Reliability Management*, 36(9), 1574–1599.
- 35 Tate, W. L., & Bals, L. (2018). Achieving shared triple bottom line (TBL) value creation:
36 Toward a social resource-based view (SRBV) of the firm. *Journal of Business Ethics*,
37 152(3), 803–826.
- 38 Timothy, B. (2015). *Confirmatory factor analysis for applied research*. Guilford Press.
- 39 Toivonen, M. (2016). *Service innovation: Novel ways of creating value in actor systems*
40 (Translational Systems Sciences Book 6) (1st ed.). Springer.

- 1 Tsai, M. C., & Wang, C. (2017). Linking service innovation to firm performance: The roles
2 of ambidextrous innovation and market orientation capability. *Chinese Management*
3 *Studies*, 11(4), 730–750.
- 4 UAE Government. (2019). *Happiness*. [https://government.ae/en/about-the-uae/the-uae-](https://government.ae/en/about-the-uae/the-uae-government/government-of-future/happiness)
5 [government/government-of-future/happiness](https://government.ae/en/about-the-uae/the-uae-government/government-of-future/happiness)
- 6 UAE Government. (2020). *Environmental challenges*.
7 [https://www.government.ae/en/information-and-services/environment-and-](https://www.government.ae/en/information-and-services/environment-and-energy/environmental-challenges-in-the-uae)
8 [energy/environmental-challenges-in-the-uae](https://www.government.ae/en/information-and-services/environment-and-energy/environmental-challenges-in-the-uae)
- 9 Utami, D. D., & Harahap, M. E. (2019). Critical success factors of total quality management
10 and their impact on performance in the Indonesian public service sector. In *12th*
11 *International Conference on Business and Management Research (ICBMR 2018)* (pp.
12 250–257). Atlantis Press.
- 13 Verhoest, K. (2010). Introduction: Reforming public sector organizations. In P. Lægreid, &
14 K. Verhoest (Eds.), *Governance of public sector organizations* (pp. 1–18). Palgrave
15 Macmillan.
- 16 Vokurka, R. Stading, G., & Brazeal, J. (2000). A comparative analysis of national and
17 regional quality awards. *Quality Progress*, 33(8), 41–50.
- 18 Volberda, H. W., Van Den Bosch, F. A., & Heij, C. V. (2013). Management innovation:
19 Management as fertile ground for innovation. *European Management Review*, 10(1),
20 1–15.
- 21 Walker, A., Oyewobi, L. O., Windapo, A. O., & Rotimi, J. O. B. (2015). Measuring strategic
22 performance in construction companies: A proposed integrated model. *Journal of*
23 *Facilities Management*, 13(2), 109–132.
- 24 Weber, O. (2017). Corporate sustainability and financial performance of Chinese banks.
25 *Sustainability Accounting, Management and Policy Journal*, 8(3), 358–385.
- 26 Wiengarten, F., & Pagell, M. (2012). The importance of quality management for the success
27 of environmental management initiatives. *International Journal of Production*
28 *Economics*, 140, 407–415.
- 29 Wu, S. J. (2015). The impact of quality culture on quality management practices and
30 performance in Chinese manufacturing firms. *International Journal of Quality &*
31 *Reliability Management*, 32(8), 799–814.
- 32 Wyman, O. (2018). *Achieving sustainable development goals in the UAE*.
33 [https://www.oliverwyman.com/content/dam/oliver-](https://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2019/july/achieving-the-sustainable-development-goals-in-the-uae.pdf)
34 [wyman/v2/publications/2019/july/achieving-the-sustainable-development-goals-in-](https://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2019/july/achieving-the-sustainable-development-goals-in-the-uae.pdf)
35 [the-uae.pdf](https://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2019/july/achieving-the-sustainable-development-goals-in-the-uae.pdf)
- 36 Wynen, J., Verhoest, K., & Demuzere S. (2016), Quality management in public-sector
37 organizations: Evidence from six EU countries. *International Journal of Public*
38 *Administration*, 39(2), 122–134.
- 39 Xie, X., Huo, J., & Zou, H. (2019). Green process innovation, green product innovation, and
40 corporate financial performance: A content analysis method. *Journal of Business*
41 *Research*, 101, 697–706.

- 1 Yeng, S. K., Jusoh, M. S., & Ishak, N. A. (2018). The impact of total quality management
2 (TQM) on competitive advantage: A conceptual mixed method study in the Malaysia
3 luxury hotel industries. *Academy of Strategic Management Journal*, 17(2), 1–9.
- 4 Yu, Y., & Huo, B. (2019). The impact of environmental orientation on supplier green
5 management and financial performance: the moderating role of relational capital.
6 *Journal of Cleaner Production*, 211, 628–639.
- 7 Yusr, M. M., Mokhtar, S. S. M., Othman, A. R., & Sulaiman, Y. (2017). Does interaction
8 between TQM practices and knowledge management processes enhance the
9 innovation performance? *International Journal of Quality & Reliability Management*,
10 34(7), 955–974.
- 11 Zaiğ, A., & Berteau, P. (2011). Methods for testing discriminant validity. *Management &*
12 *Marketing Journal*, 9 (2), 217–224.
- 13 Zehir, C., Ertosun, Ö., Zehir, S., & Müceldilli, B. (2012). Total quality management practices
14 effects on quality performance and innovative performance. *Procedia Engineering*,
15 41(12), 273–280.
- 16 Zhu, Q., Sarkis, J., & Lai, K. (2013). Institutional-based antecedents and performance
17 outcomes of internal and external green supply chain management practices. *Journal*
18 *of Purchasing and Supply Management*, 19(2), 106–117.

APPENDICES

Appendix A. Questionnaire (English Version)

“Total Quality Management, Service Innovation, and Sustainability Performance in Abu Dhabi’s public sector”

Dear valued respondent,

Total Quality Management (TQM) and service innovation are both used in the public sector organizations as a mean to enhance sustainability performance. To that extent, the aim of this research is to “Empirically investigate the association between TQM, service innovation, and sustainability performance in the context of Abu Dhabi’s public sector.”

We would really appreciate if you could spare 10–20 minutes of your time to complete the following questionnaire.

This questionnaire is intended for employees that are currently working in Abu Dhabi’s public sector. Your contribution is highly appreciated and will be used for academic purposes only. Please be certain that any information or responses will remain anonymous. Moreover, if you decided not wish to participate, you can withdraw yourself at any time.

For further inquiry about this study, you may contact the researcher at [REDACTED].

Thank you for accepting to be a part in this study.

Please indicate the extent to which you agree or disagree with the following statements by circling one of the numbers from 1 to 5 using the scale below

Strongly disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly agree (5)

SECTION 1 SUSTAINABILITY PERFORMANCE

To what extent do you agree to the fact that the following factors (Environmental, Social, Economic factors) have an impact on sustainability performance?

(Abbas, 2020; Lu *et al.*, 2011; Muhamad *et al.*, 2014; Tasleem *et al.*, 2019; Hollingworth & Valentine, 2014; Kang *et al.*, 2015)

Sustainability copes with suitable response paradigms in respect of economic, social and environmental responsibilities in relation to products, services, processes, and organizational performance

To what extent do you agree to the fact that the following Environmental Sustainability factors have an impact on public sector’s sustainability performance?					
Promotion and protection of natural resources and the natural environment	1	2	3	4	5
Waste management and cleaner production	1	2	3	4	5
Reduced resources consumption and low carbon dioxide (CO ₂) emission	1	2	3	4	5
Less noise level inside and outside the workplace	1	2	3	4	5
Compliance with environmental management system – ISO 14001	1	2	3	4	5

To what extent do you agree to the fact that the following Social factors have an impact on public sector's sustainability performance?					
Social development programs & contribution to non-profit organizations	1	2	3	4	5
Reducing health and safety risks and incidents to workforce and community	1	2	3	4	5
Workforce engagement and satisfaction to improve workforce capacities					
Improving customer relationship building, which will get more strengthened	1	2	3	4	5
Improved organizational image reflecting good practices amongst the community	1	2	3	4	5
To what extent do you agree to the fact that the following Economic factors have an impact on public sector's sustainability performance?					
Improving measures and results related to capabilities, capacities and productivity	1	2	3	4	5
Improving market performance, position or general market reputation	1	2	3	4	5
Enhancing financial performance and results	1	2	3	4	5
Attained various awards for bring excellent performance in its business practices.	1	2	3	4	5
The organizational status is more stable, competitive and sustainable as a result	1	2	3	4	5

SECTION 2: TOTAL QUALITY MANAGEMENT (TQM)

To what extent do you agree to the fact that following TQM factors (*Leadership, People, Process, Strategy & Policy, Partnership & Resources*) have an impact on sustainability performance?

(Abbas, 2020; Androwis *et al.*, 2018; ADAEP, 2007; Berman, 2015; Fatima & Mahaboob, 2018; Ooi, 2014; Shafiq *et al.*, 2019)

TQM is an approach to do business attempting to maximize an organization's competitiveness via the continual improvement in respect of the quality of its products, services, processes, people, and environments

To what extent do you agree to the fact that the Leadership has an impact on sustainability performance?					
Responsible for quality assurance and quality improvement efforts	1	2	3	4	5
Focus on quality goals, efforts, and plans concerning time and cost.	1	2	3	4	5
Views to improve quality as a way to increase sustainability performance	1	2	3	4	5
Evaluation and improvement of management system and leading quality drivers	1	2	3	4	5
Arranging adequate resources for employee education and training	1	2	3	4	5
To what extent do you agree to the fact that People has an impact on sustainability performance?					
Formal processes (e.g. surveys) to realize employees' opinions and views	1	2	3	4	5
Providing specific quality training to employees	1	2	3	4	5
Encouraging to update employees' knowledge and skills	1	2	3	4	5
Considering teamwork as a common practice within the organization	1	2	3	4	5
Encouraging employee's opinions and suggestions to organizational activities	1	2	3	4	5
To what extent do you agree to the fact that Process has an impact on sustainability performance?					
Clear division of process, ownership, and responsibility	1	2	3	4	5
Ensuring the perfect product or service design, and process control	1	2	3	4	5
Continuous improvement by self-inspection and automation	1	2	3	4	5
Standardized process instruction given to employees	1	2	3	4	5
Programs to find waste time and cost amongst internal process	1	2	3	4	5
How do you agree to the fact that Strategy & Policy has an impact on sustainability performance?					
Vision and mission for quality	1	2	3	4	5
Communicating vision and mission to stakeholders	1	2	3	4	5

A structured planning process setting and reviewing short and long-term goals	1	2	3	4	5
Incorporating all stakeholders' needs to organizational policies and objectives	1	2	3	4	5
A written statement of strategy covering all business operations	1	2	3	4	5
To what extent do you agree to the fact that the following Partnership & Resources has an impact on sustainability performance?					
Encouraging suppliers to develop long-term partnerships with the organization	1	2	3	4	5
Preference to quality over cost while making purchase agreements with suppliers	1	2	3	4	5
Periodically evaluating performance of the suppliers	1	2	3	4	5
Updated information and resources to all employees to perform their jobs	1	2	3	4	5
Efforts to reduce the harmful effect of activities and resources on the environment	1	2	3	4	5

SECTION 3 SERVICE INNOVATION

To what extent do you agree to the fact that the following factors (Product & Process Innovation, Organizational Innovation) have an impact on sustainability performance?
(Aas and Pedersen, 2010)

Service innovation can be seen in numerous scenarios within service sector that develop completely a new type of services or improving existing services

To what extent do you agree to the fact that the following Product & Process Innovation factors have an impact on public sector's sustainability performance?					
Developing new services	1	2	3	4	5
Developing new methods of manufacturing	1	2	3	4	5
Introducing new logistics, delivery or distribution methods	1	2	3	4	5
Introducing new supporting activities for processes	1	2	3	4	5
To what extent do you agree to the fact that the following Organizational Innovation factors have an impact on public sector's sustainability performance?					
Introducing new business practices for organizing work or procedures	1	2	3	4	5
Developing new knowledge management systems	1	2	3	4	5
Novel workplace organization for distributing responsibilities and decision making	1	2	3	4	5
New methods of organizing external relations with other firms/institutions	1	2	3	4	5

SECTION 4: DEMOGRAPHICS

1. Gender

☐ Male ☐ Female

2. Your profession/occupation

☐ Officer / Engineer ☐ Supervisor/Senior engineer ☐ Team Leader/Head of Section
☐ Manager/Director ☐ Vice President ☐ Senior Vice President ☐ President / CEO

3. Highest level of education attained

☐ High school ☐ College diploma ☐ Bachelor's degree ☐ Postgraduate degree (MA/MSc/PhD)

4. Number of years of experience

☐ 0 to 5 years ☐ 6 to 10 years ☐ 11 to 15 years ☐ 16 to 20 years ☐ Above 20 years

1

2 Appendix B. Questionnaire (Arabic Version)

3 "إدارة الجودة الشاملة، وابتكار الخدمات، وأداء الاستدامة في القطاع الحكومي في دولة الإمارات 4 العربية المتحدة"

5 عزيزي الموظف،

6 يتم استخدام إدارة الجودة الشاملة (TQM) والابتكار في الخدمات في مؤسسات القطاع الحكومي كوسيلة لتعزيز أداء الاستدامة. ولذلك، يهدف هذا
7 البحث إلى "اكتشاف الارتباط بين إدارة الجودة الشاملة الابتكار في مجال الخدمات وأداء الاستدامة في سياق القطاع الحكومي في دولة الإمارات
8 العربية المتحدة"

9 ونحن نقدر لك إن كان بإمكانك ادخار 10-20 دقيقة من وقتك لاستكمال الاستبيان التالي.

10

11 هذا الاستبيان مخصص للموظفين الذين يعملون حالياً في القطاع الحكومي في دولة الإمارات العربية المتحدة. مساهمتك تحظى بتقدير كبير وسوف
12 تستخدم لأغراض أكاديمية فقط. يرجى العلم أن جميع الردود ستبقى مجهولة المصدر وفي حال قررت عدم المشاركة يمكنك الانسحاب في أي
13 وقت.

14 للمزيد من الاستفسار حول هذه الدراسة، يمكنك التواصل مع الباحث على: [Redacted]

15 شكراً لقبولك أن تكون جزءاً في هذه الدراسة.

16

17 يرجى بيان مدى موافقتك أو عدم موافقتك على البيانات التالية من خلال اختيار أحد الأرقام من 1 إلى 5 باستخدام المقياس أدناه

18 غير موافق بشدة (1) غير موافق (2) محايد (3) موافق (4) موافق بشدة (5)

القسم الأول: أداء الاستدامة

ما مدى موافقتك على حقيقة أن العوامل التالية (العوامل البيئية والاجتماعية والاقتصادية) لها تأثير على أداء الاستدامة؟

19 الاستدامة تتكيف مع نماذج الاستجابة المناسبة فيما يتعلق بالمسؤوليات الاقتصادية والاجتماعية والبيئية وارتباطها بالمنتجات والخدمات والعمليات
20 والأداء المؤسسي

كيف توافق على حقيقة أن عوامل الاستدامة البيئية التالية لها تأثير على أداء الاستدامة في القطاع الحكومي؟					
5	4	3	2	1	تعزيز وحماية الموارد الطبيعية والبيئة الطبيعية
5	4	3	2	1	إدارة النفايات والإنتاج النظيف
5	4	3	2	1	انخفاض استهلاك الموارد وانخفاض انبعاثات ثاني أكسيد الكربون
5	4	3	2	1	مستوى ضوضاء أقل داخل وخارج مكان العمل
5	4	3	2	1	الامتثال لنظام الإدارة البيئية - ISO 14001
كيف توافق على حقيقة أن العوامل الاجتماعية التالية لها تأثير على أداء الاستدامة في القطاع الحكومي؟					
5	4	3	2	1	برامج التنمية الاجتماعية والمساهمة في المنظمات غير الربحية
5	4	3	2	1	الحد من مخاطر الصحة والسلامة والحوادث على القوى العاملة والمجتمع

5	4	3	2	1	إشراك القوى العاملة ورفع مستوى الرضا لتحسين قدرات القوى العاملة
5	4	3	2	1	تحسين بناء العلاقات مع المتعاملين، وبذلك تكون أكثر صلابة
5	4	3	2	1	تحسين صورة المؤسسة والتي تعكس ممارسات جيدة في المجتمع
كيف توافق على حقيقة أن العوامل الاقتصادية التالية لها تأثير على أداء الاستدامة في القطاع الحكومي ؟					
5	4	3	2	1	تحسين التدابير والنتائج المتعلقة بالقدرات والطاقت والإنتاجية
5	4	3	2	1	تحسين أداء السوق أو مكانة السوق أو سمعة السوق العامة
5	4	3	2	1	تعزيز الأداء المالي والنتائج
5	4	3	2	1	الحصول على جوائز مختلفة لتحقيق أداء متميز في عملياتها المؤسسية
5	4	3	2	1	يكون وضع المؤسسات أكثر استقراراً وتنافسية واستدامة نتيجة لذلك

1

القسم الثاني: إدارة الجودة الشاملة					
ما مدى موافقتك على حقيقة أن اتباع عوامل إدارة الجودة الشاملة (القيادة والأشخاص والعمليات والاستراتيجية والسياسات والشراكة والموارد) لها تأثير على أداء الاستدامة؟					

2 إدارة الجودة الشاملة هو نهج للقيام بالأعمال التجارية في محاولة لتحقيق أقصى قدر من القدرة التنافسية للمؤسسة من خلال التحسين المستمر فيما يتعلق بجودة منتجاتها وخدماتها وعملياتها وأشخاصها وبيئاتها

3

كيف توافق على حقيقة أن القيادة لها تأثير على أداء الاستدامة؟					
5	4	3	2	1	مسؤولية عن ضمان الجودة وجهود تحسين الجودة
5	4	3	2	1	التركيز على أهداف الجودة والجهود والخطط المتعلقة بالوقت والتكلفة
5	4	3	2	1	وجهات النظر لتحسين الجودة كوسيلة لزيادة أداء الاستدامة
5	4	3	2	1	تقييم وتحسين نظام الإدارة ومحركات الجودة الرائدة
5	4	3	2	1	توفير الموارد الكافية لتعليم وتدريب الموظفين
كيف توافق على حقيقة أن الأفراد يؤثرون على أداء الاستدامة؟					
5	4	3	2	1	العمليات الرسمية (مثل الاستبيانات) لمعرفة آراء الموظفين ووجهات نظرهم
5	4	3	2	1	توفير تدريب عالي الجودة للموظفين
5	4	3	2	1	تشجيع تحديث معارف ومهارات الموظفين
5	4	3	2	1	اعتبار العمل الجماعي ممارسة شائعة داخل المؤسسة
5	4	3	2	1	تشجيع آراء الموظفين واقتراحاتهم على الأنشطة المؤسسية
كيف توافق على حقيقة أن العمليات لها تأثير على أداء الاستدامة؟					
5	4	3	2	1	تقسيم واضح للعمليات والملكية والمسؤولية
5	4	3	2	1	ضمان تصميم المنتج أو تصميم الخدمة، والتحكم في العملية
5	4	3	2	1	التحسين المستمر من خلال التفتيش الذاتي والأتمتة
5	4	3	2	1	توحيد العمليات الخاصة بتوجيه الموظفين وإرشادهم
5	4	3	2	1	برامج لتحديد الوقت والضائع والتكلفة الضائعة للعمليات الداخلية
كيف توافق على حقيقة أن الاستراتيجية والسياسة لها تأثير على أداء الاستدامة؟					
5	4	3	2	1	الرؤية والرسالة من أجل الجودة
5	4	3	2	1	إيصال الرؤية والرسالة إلى أصحاب المصلحة

5	4	3	2	1	وضع عملية تخطيط منظمة واستعراض الأهداف القصيرة والطويلة الأجل
5	4	3	2	1	دمج احتياجات جميع أصحاب المصلحة في السياسات والأهداف المؤسسية
5	4	3	2	1	تطوير استراتيجية مؤسسية تغطي كافة العمليات المؤسسية
كيف توافق على حقيقة أن الشراكة والموارد التالية لها تأثير على أداء الاستدامة؟					
5	4	3	2	1	تشجيع الموردين على إقامة شراكات طويلة الأمد مع المؤسسة
5	4	3	2	1	تفضيل الجودة على التكلفة أثناء إبرام اتفاقيات شراء مع الموردين
5	4	3	2	1	التقييم الدوري لأداء الموردين
5	4	3	2	1	تحديث المعلومات والموارد لجميع الموظفين لأداء وظائفهم
5	4	3	2	1	الجهود الرامية للحد من الأثر الضار للأنشطة والموارد على البيئة

1

القسم الثالث: الابتكار في الخدمات

ما مدى موافقتك على حقيقة أن العوامل التالية (الابتكار في المنتج والعمليات ، الابتكار المؤسسي) لها تأثير على أداء الاستدامة؟

2 يمكن رؤية الابتكار في الخدمات في العديد من السيناريوهات داخل قطاع الخدمات التي تطور نوعًا جديدًا تمامًا من الخدمات أو تحسين الخدمات الحالية

3

كيف توافق على حقيقة أن عوامل الابتكار في المنتجات والعمليات التالية لها تأثير على أداء الاستدامة في القطاع الحكومي؟					
5	4	3	2	1	تطوير خدمات جديدة
5	4	3	2	1	تطوير أساليب جديدة للتصنيع
5	4	3	2	1	استحداث أساليب لوجستية أو تسليم أو توزيع جديدة
5	4	3	2	1	إدخال أنشطة دعم جديدة للعمليات
كيف توافق على حقيقة أن عوامل الابتكار المؤسسي التالية لها تأثير على أداء الاستدامة في القطاع الحكومي؟					
5	4	3	2	1	إدخال ممارسات تجارية جديدة لتنظيم العمل أو الإجراءات
5	4	3	2	1	تطوير نظم جديدة لإدارة المعارف المؤسسية
5	4	3	2	1	تفعيل وحدة تنظيمية جديدة لتوزيع المسؤوليات واتخاذ القرارات
5	4	3	2	1	أساليب جديدة لتنظيم العلاقات الخارجية مع الشركات/المؤسسات الأخرى

4

القسم الرابع: Demographics

5 1. الجنس

6 ☐ ذكر ☐ أنثى

7

8 2. المهنة/ الوظيفة

9 ☐ ضابط / مهندس ☐ مشرف / مهندس أول ☐ رئيس فريق / رئيس القسم ☐ مسؤول / مدير

10 ☐ نائب رئيس ☐ نائب رئيس أول ☐ رئيس / مدير تنفيذي

11 3. أعلى مستوى من التعليم تم بلوغه

1 ☐ ثانوية عامة ☐ دبلوم ☐ بكالوريوس ☐ دراسات عليا (ماجستير /دكتوراه)

2 4. عدد سنوات الخبرة

3 ☐ 5-0 سنوات ☐ 6-10 سنوات ☐ 11-15 سنة ☐ 16-20 سنة ☐ أكثر من 20 سنة

4

5

1

2 **Appendix C. Multivariate Outliers**

Mahalanobis (D2)	Probability of D2	Mahalanobis (D2)	Probability of D3
214.231	0.0000000	99.896	1.11E-05
146.399	0.0000000	94.895	4.41E-05
145.956	0.0000000	93.474	6.48E-05
142.704	0.0000000	92.162	9.19E-05
136.248	0.0000000	92.135	9.25E-05
125.729	0.0000000	91.899	9.85E-05
125.605	0.0000000	91.709	0.000104
120.224	0.0000000	91.288	0.000116
118.786	0.0000000	90.750	0.000133
117.137	0.0000001	90.026	0.000161
115.050	0.0000001	89.895	0.000166
114.643	0.0000001	89.526	0.000183
114.274	0.0000002	88.699	0.000227
113.006	0.0000002	87.624	0.000298
111.683	0.0000003	87.557	0.000303
111.587	0.0000004	86.550	0.000391
111.456	0.0000004	84.214	0.000696
105.019	0.0000025	83.484	0.000832
103.883	0.0000035	83.473	0.000834
103.210	0.0000043	83.079	0.000917
100.388	0.0000096	82.934	0.00095

3

4

5

Appendix D. Descriptive Statistics

	<i>n</i>	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
ENV1	433	1	5	4.36	0.726	-1.541	0.117	4.354	0.234
ENV2	433	1	5	4.37	0.708	-1.448	0.117	4.005	0.234
ENV3	433	1	5	4.29	0.784	-1.171	0.117	1.771	0.234
ENV4	433	1	5	4.26	0.743	-.996	0.117	1.715	0.234
ENV5	433	1	5	4.13	0.781	-1.025	0.117	2.014	0.234
SCL1	433	1	5	4.07	0.728	-0.718	0.117	1.427	0.234
SCL2	433	1	5	4.22	0.717	-0.882	0.117	1.776	0.234
SCL3	433	1	5	4.15	0.839	-1.013	0.117	1.211	0.234
SCL4	433	1	5	3.99	0.935	-1.022	0.117	1.151	0.234
SCL5	433	1	5	4.38	0.723	-1.495	0.117	3.849	0.234
ECN1	433	1	5	4.30	0.682	-1.163	0.117	3.296	0.234
ECN2	433	1	5	4.29	0.697	-1.131	0.117	2.878	0.234
ECN3	433	1	5	4.29	0.744	-1.031	0.117	1.515	0.234
ECN4	433	1	5	4.37	0.690	-1.243	0.117	3.077	0.234
ECN5	433	1	5	4.39	0.705	-1.462	0.117	4.033	0.234
LED1	433	1	5	4.48	0.694	-1.782	0.117	4.202	0.234
LED2	433	1	5	4.43	0.660	-1.428	0.117	4.245	0.234
LED3	433	1	5	4.30	0.694	-0.930	0.117	1.748	0.234
LED4	433	1	5	4.35	0.674	-1.190	0.117	3.320	0.234

LED5	433	1	5	4.48	0.677	-1.598	0.117	4.384	0.234
PPL1	433	1	5	4.20	0.791	-1.097	0.117	2.010	0.234
PPL2	433	1	5	4.45	0.679	-1.527	0.117	4.137	0.234
PPL3	433	1	5	4.50	0.620	-1.360	0.117	3.860	0.234
PPL4	433	1	5	4.40	0.782	-1.686	0.117	3.987	0.234
PPL5	433	1	5	4.47	0.684	-1.621	0.117	4.667	0.234
PRS1	433	1	5	4.29	0.752	-1.279	0.117	2.996	0.234
PRS2	433	1	5	4.29	0.681	-1.136	0.117	3.249	0.234
PRS3	433	1	5	4.37	0.664	-1.003	0.117	2.146	0.234
PRS4	433	1	5	4.30	0.770	-1.295	0.117	2.434	0.234
PRS5	433	1	5	4.29	0.763	-1.241	0.117	2.636	0.234
SGP1	433	1	5	4.32	0.691	-0.982	0.117	1.904	0.234
SGP2	433	1	5	4.32	0.697	-1.144	0.117	2.801	0.234
SGP3	433	1	5	4.43	0.660	-1.269	0.117	3.099	0.234
SGP4	433	1	5	4.33	0.706	-1.078	0.117	2.039	0.234
SGP5	433	1	5	4.35	0.674	-1.099	0.117	2.584	0.234
PDR1	433	1	5	4.39	0.669	-1.211	0.117	3.215	0.234
PDR2	433	1	5	4.21	0.771	-0.950	0.117	1.386	0.234
PDR3	433	1	5	4.43	0.653	-1.160	0.117	2.673	0.234
PDR4	433	1	5	4.41	0.647	-1.167	0.117	2.993	0.234
PDR5	433	1	5	4.30	0.699	-0.979	0.117	1.870	0.234
PPR1	433	1	5	4.41	0.692	-1.462	0.117	4.158	0.234
PPR2	433	1	5	4.42	0.680	-1.338	0.117	3.384	0.234
PPR3	433	1	5	4.40	0.710	-1.447	0.117	3.771	0.234
PPR4	433	1	5	4.39	0.685	-1.326	0.117	3.492	0.234
INN1	433	1	5	4.27	0.702	-1.031	0.117	2.453	0.234

INN2	433	1	5	4.27	0.711	-0.958	0.117	1.725	0.234
INN3	433	1	5	4.11	0.872	-0.932	0.117	0.659	0.234
INN4	433	1	5	4.28	0.702	-0.974	0.117	1.902	0.234
Valid <i>n</i> (listwise)	433								

Appendix E. Total Variance Explained and Communalities

A. Common Method Bias (Harman's One-Factor Analysis)

Total Variance Explained			
Factor	Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	18.620	38.792	38.792

Note: Extraction method: principal axis factoring.

B. Total Variance Explained by the 10-Factor Solution

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings ^a
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	19.217	40.036	40.036	19.217	40.036	40.036	10.278
2	2.559	5.331	45.366	2.559	5.331	45.366	10.487
3	1.730	3.605	48.971	1.730	3.605	48.971	12.802
4	1.608	3.350	52.321	1.608	3.350	52.321	11.088
5	1.421	2.961	55.282	1.421	2.961	55.282	13.252
6	1.390	2.896	58.178	1.390	2.896	58.178	11.049
7	1.160	2.417	60.596	1.160	2.417	60.596	8.229
8	1.075	2.240	62.836	1.075	2.240	62.836	10.018
9	1.005	2.094	64.929	1.005	2.094	64.929	11.193
10	0.971	2.024	66.953	0.971	2.024	66.953	6.146
11	0.888	1.849	68.802				
12	0.847	1.764	70.566				
13	0.820	1.708	72.274				
14	0.778	1.621	73.895				
15	0.671	1.397	75.292				
16	0.639	1.331	76.622				
17	0.622	1.295	77.918				
18	0.602	1.254	79.172				
19	0.587	1.223	80.394				
20	0.567	1.181	81.575				
21	0.526	1.097	82.672				
22	0.511	1.065	83.737				
23	0.475	0.990	84.727				
24	0.463	0.965	85.693				

25	0.440	0.916	86.609				
26	0.433	0.902	87.511				
27	0.414	0.862	88.372				
28	0.395	0.822	89.195				
29	0.384	0.800	89.995				
30	0.369	0.768	90.763				
31	0.351	0.731	91.494				
32	0.339	0.707	92.200				
33	0.325	0.678	92.878				
34	0.305	0.636	93.515				
35	0.288	0.601	94.115				
36	0.281	0.586	94.702				
37	0.267	0.557	95.259				
38	0.267	0.557	95.816				
39	0.251	0.523	96.339				
40	0.237	0.493	96.832				
41	0.233	0.486	97.318				
42	0.229	0.477	97.796				
43	0.217	0.452	98.248				
44	0.207	0.432	98.680				
45	0.186	0.387	99.066				
46	0.161	0.335	99.401				
47	0.149	0.310	99.711				
48	0.139	0.289	100.000				

Notes: Extraction method: principal component analysis. ^a When components are correlated, sums of squared loadings cannot be added to obtain a total variance..

C. Communalities

	Initial	Extraction
ENV1	1.000	0.670
ENV2	1.000	0.723
ENV3	1.000	0.676
ENV4	1.000	0.556
ENV5	1.000	0.581
SCL1	1.000	0.514
SCL2	1.000	0.702
SCL3	1.000	0.614
SCL4	1.000	0.698
SCL5	1.000	0.638
ECN1	1.000	0.685
ECN2	1.000	0.703
ECN3	1.000	0.496

ECN4	1.000	0.639
ECN5	1.000	0.501
LED1	1.000	0.732
LED2	1.000	0.733
LED3	1.000	0.712
LED4	1.000	0.738
LED5	1.000	0.632
PPL1	1.000	0.491
PPL2	1.000	0.728
PPL3	1.000	0.737
PPL4	1.000	0.620
PPL5	1.000	0.721
PRS1	1.000	0.640
PRS2	1.000	0.712
PRS3	1.000	0.633
PRS4	1.000	0.564
PRS5	1.000	0.617
SGP1	1.000	0.724
SGP2	1.000	0.769
SGP3	1.000	0.742
SGP4	1.000	0.722
SGP5	1.000	0.741
PDR1	1.000	0.620
PDR2	1.000	0.612
PDR3	1.000	0.686
PDR4	1.000	0.723
PDR5	1.000	0.710
PPR1	1.000	0.682
PPR2	1.000	0.792
PPR3	1.000	0.760
PPR4	1.000	0.762
INN1	1.000	0.634
INN2	1.000	0.667
INN3	1.000	0.659
INN4	1.000	0.724

Note: Extraction method: principal component analysis.

Appendix F. Coding the Items Used for the EFA

ENV1: Promotion and protection of natural resources and natural environment
ENV2: Waste management and cleaner production
ENV3: Reduced resources consumption and low carbon dioxide (CO ₂) emission
ENV4: Less noise level inside and outside the workplace
ENV5: Compliance with environmental management system - ISO 14001
SCL1: Social development programs & contribution to non-profit organizations
SCL2: Reducing health and safety risks and incidents to workforce and community
SCL3: Workforce engagement and satisfaction to improve workforce capacities
SCL4: Improving customer relationship building, which will get more strengthened
SCL5: Improved organizational image reflecting good practices amongst the community
ECN1: Improving measures and results related to capabilities, capacities and productivity
ECN2: Improving market performance, position or general market reputation
ECN3: Enhancing financial performance and results
ECN4: Attained various awards for bring excellent performance in its business practices.
ECN5: The organizational status is more stable, competitive and sustainable as a result
LED1: Responsible for quality assurance and quality improvement efforts
LED2: Focus on quality goals, efforts, and plans concerning time and cost.
LED3: Views to improve quality as a way to increase sustainability performance
LED4: Evaluation and improvement of management system and leading quality drivers
LED5: Arranging adequate resources for employee education and training
PPL1: Formal processes (e.g. surveys) to realize employees' opinions and views
PPL2: Providing specific quality training to employees
PPL3: Encouraging to update employees' knowledge and skills
PPL4: Considering teamwork as a common practice within the organization
PPL5: Encouraging employee's opinions and suggestions to organizational activities
PRS1: Clear division of process, ownership, and responsibility
PRS2: Ensuring the perfect product or service design, and process control
PRS3: Continuous improvement by self-inspection and automation
PRS4: Standardized process instruction given to employees
PRS5: Programs to find waste time and cost amongst internal processes
SGP1: Vision and mission for quality
SGP2: Communicating vision and mission to stakeholders
SGP3: A structured planning process setting and reviewing short and long-term goals
SGP4: Incorporating all stakeholders' needs to organizational policies and objectives
SGP5: A written statement of strategy covering all business operations
PDR1: Encouraging suppliers to develop long-term partnerships with the organization
PDR2: Preference to quality over cost while making purchase agreements with suppliers
PDR3: Periodically evaluating performance of the suppliers
PDR4: Updated information and resources to all employees to perform their jobs
PDR5: Efforts to reduce the harmful effect of activities and resources on the environment
PPR1: Developing new services
PPR2: Developing new methods of manufacturing

PPR3: Introducing new logistics, delivery or distribution methods
PPR4: Introducing new supporting activities for processes
INN1: Introducing new business practices for organizing work or procedures
INN2: Developing new knowledge management systems
INN3: Novel workplace organization for distributing responsibilities and decision making
INN4: New methods of organizing external relations with other firms/institutions